Release Note

Software Version 2.7.4

For AT-9900, AT-8900, SwitchBlade, AT-9800, AT-8800, Rapier i, AT-8700XL, and AT-8600 Series Switches and AR400 and AR700 Series Routers

Introduction

Allied Telesyn announces the release of Software Version 2.7.4 on the products shown in Table 1. This Release Note describes the new features in Software Version 2.7.4 on any product. The product series each feature and enhancement applies to are shown in "Overview of New Features" on page 4.

Table 1: Products supported by Software Version 2.7.4

Product series	Models
AT-9900	AT-9924T, AT-9924SP, AT-9924T/4SP
AT-8900	AT-8948
SwitchBlade	AT-SB4004, AT-SB4008
SwitchBlade V2	AT-SB4004 V2, AT-SB4008 V2
AT-9800	AT-9812T, AT-9816GB
Rapier i	Rapier 24i, Rapier 48i, Rapier 16fi
AT-8800	AT-8824, AT-8848
AT-8700XL	AT-8724XL, AT-8748XL
AT-8600	AT-8624T/2M, AT-8624PoE
AR700	AR725, AR745, AR750S
AR400	AR440S, AR441S, AR450S

This Release Note should be read in conjunction with the Installation and Safety Guide or Quick Install Guide, Hardware Reference, and Software Reference for your switch or router. These documents can be found on the Documentation and Tools CD-ROM packaged with your switch or router, or at

www.alliedtelesyn.com

www.alliedtelesyn.co.nz/documentation/documentation.html

This Release Note has the following sections:

1. **Upgrading to Software Version 2.7.4**

   This section lists the file names that may be downloaded from the web site.

2. **Description of New Features in Software Version 2.7.4**

   This section lists the features that are new for Software Version 2.7.4 and describes how to configure them.

3. **Using the Graphical User Interface (GUI) on AT-9900 Switches**

Caution: Information in this document is subject to change without notice and does not represent a commitment on the part of Allied Telesyn Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesyn Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.

Upgrading to Software Version 2.7.4

Software Version 2.7.4 is available as a flash release that can be downloaded directly from the Software Updates area of the Allied Telesyn web site at:

www.alliedtelesyn.com

www.alliedtelesyn.co.nz/support/updates/

Software versions must be licenced and require a password to activate. To obtain a licence and password, contact your authorised Allied Telesyn distributor or reseller.

Table 2: File names for Software Version 2.7.4

Product name	Release file	GUI resource file	CLI help file
AT-9924T	89-274.rez	d9924e22.rsc	99-274a.hlp
AT-9924SP	89-274.rez	d9924e22.rsc	99-274a.hlp
AT-9924T/4SP	89-274.rez	d9924e22.rsc	99-274a.hlp
AT-8948	89-274.rez	—	89-274a.hlp
AT-SB4004 V2	sb-274.rez	d_sb4e22.rsc	sb-274a.hlp
AT-SB4008 V2	sb-274.rez	d_sb8e22.rsc	sb-274a.hlp
AT-SB4004	sb-274.rez	d_sb4e22.rsc	sb-274a.hlp
AT-SB4008	sb-274.rez	d_sb8e22.rsc	sb-274a.hlp
AT-9812T	sb-274.rez	d9812e22.rsc	98-274a.hlp
AT-9816GB	sb-274.rez	d9816e22.rsc	98-274a.hlp
Rapier 24i	86s-274.rez	dr24ie22.rsc	rp-274a.hlp
Rapier 48i	86s-274.rez	dr48ie22.rsc	rp-274a.hlp
Rapier16fi	86s-274.rez	dr16ie22.rsc	rp-274a.hlp
AT-8824	86s-274.rez	d8824e22.rsc	88-274a.hlp
AT-8848	86s-274.rez	d8848e22.rsc	88-274a.hlp
AT-8724XL	87-274.rez	d8724e22.rsc	87-274a.hlp
AT-8748XL	87-274.rez	d8748e22.rsc	87-274a.hlp
AT-8624PoE	sr-274.rez	—	86-274a.hlp
AT-8624T/2M	sr-274.rez	dsr24e22.rsc	86-274a.hlp
AR750S	55-274.rez	d750se22.rsc	700-274a.hlp
AR725	52-274.rez	d_725e22.rsc	700-274a.hlp
AR745	52-274.rez	d_745e22.rsc	700-274a.hlp
AR440S	54-274.rez	d440se22.rsc	400-274a.hlp
AR441S	54-274.rez	d441se22.rsc	400-274a.hlp
AR450S	54-274.rez	d450se22.rsc	400-274a.hlp

Overview of New Features

This section lists the new features and enhancements by product series. For supported models, see Table 1 on page 2.

Table 3: New features and enhancements in Software Version 2.7.4

	AR400	AR7x5	AR750S	Rapier	AT-8800	AT-8700XL	AT-8600	AT-9800	SwitchBlade	AT-8900	AT-9900
VoIP Phone Calls and the Firewall	✓	✓	✓	✓	✓			✓		✓	
VLAN Tagging on Multiple Logical Ethernet Interfaces	✓	✓	✓								
Link Discovery Protocol	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WAN Load Balancing			✓								
Inactivity Timeout	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Summer Time	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Displaying and Disabling All Active Debugging	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Graphical User Interface (GUI) for AT-9900 Series Switches											✓
Enhancements to Virtual Bridge (VLAN) MIB Support				✓	✓	✓	✓	✓	✓	✓	✓
RADIUS Accounting and 802.1x Dynamic VLAN Assignment	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Enhancements to Login Authentication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firewall: Using RADIUS to Authenticate MAC Addresses	✓	✓	✓	✓	✓			✓		✓	
Firewall: Automatic Teardown of Data Connections	✓	✓	✓	✓	✓			✓		✓	
OSPF: Route Filtering with Route Maps	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OSPF: Support for Passive Interfaces	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OSPF: Summary Routes for Routes Distributed in OSPF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OSPF: Enhancements to OSPF Ranges	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OSPF: Redistributing Static Routes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BGP: Enhancements to Prefix Filtering	✓	✓	✓	✓	✓			✓		✓	✓
Support for SwitchBlade V2									✓		

VoIP Phone Calls and the Firewall

Software Version 2.7.4 enables you to use internet telephony (VoIP) or video conferencing and still have your LAN protected by a firewall. This uses these new firewall features:

- SIP Application Layer Gateway
- Network Address and Port Translation (NAPT)

After describing these new features, this section contains:

- Configuring the Firewall to Allow VoIP Phone Calls, a step-by-step procedure and example for using the SIP ALG and NAPT
- New and Modified Commands

SIP Application Layer Gateway

About the SIP ALG

VoIP and other multimedia applications create sessions over the Internet between users, for example between two people speaking on telephones. Session Initiation Protocol (SIP) establishes, maintains and terminates these sessions. People making phone calls use phone numbers or email-like addresses to “call” other users, and SIP proxy servers resolve these names into IP address and UDP port. This enables the SIP proxy servers to forward voice traffic appropriately.

If users are “hidden” from the Internet behind a firewall, they cannot receive SIP messages and so cannot use internet telephony. The SIP Application Layer Gateway (ALG) enables the firewall to pass SIP messages to users behind the firewall. The SIP ALG inspects SIP packets and converts their IP addresses, UDP port numbers and other information as required.

Once SIP has established a session, the actual voice data in the phone call is carried by Real-time Transport Protocol (RTP) and Real-time Transport Control Protocol (RTCP). The SIP ALG dynamically controls the opening and closing of logical ports in order to establish, maintain, and terminate the RTP/RTCP sessions negotiated by the SIP protocol. It also modifies the RTP/RTCP packet IP addresses and port numbers to allow voice traffic across the firewall.

For more information about SIP, see the Voice over IP (VoIP) chapter of your router’s Software Reference.

The SIP ALG requires a feature licence, which is provided by default for some models. For more information, contact your authorised distributor or reseller.

Configuration

To enable the SIP ALG, use the command:

```
enable firewall sipalg
```

To see whether the SIP ALG is enabled or disabled, use one of the commands:

```
show firewall

show firewall policy
```

To see detailed information about how the firewall is processing and modifying SIP messages, use the command:

```
enable firewall policy=name
    debug={trace|message|parsing|errorcode|sipalg}
```

For a description of each of the debugging options, see Table 5 on page 11.

Network Address and Port Translation (NAPT)

About NAPT

Network Address and Port Translation (NAPT) translates the IP address and TCP/UDP port of packets sent to and from private side devices. NAPT expands on the existing NAT functionality, by giving you control over the UDP or TCP port numbers that the firewall assigns to each user's sessions.

When to use NAPT

NAPT increases the reliability of VoIP phone calls through the SIP Application Layer Gateway by avoiding changes to the UDP port number. The port number is important because public SIP proxy servers use it to locate users.

If you use enhanced NAT instead of NAPT, the firewall randomly assigns a UDP port to each user's session and uses this port number to determine which user to send incoming traffic to. Once a session is established the firewall keeps it alive, so the port number is constant until—and only until—the session is closed. Sessions are closed, for example, if a user of a soft phone logs off. When the user next logs on, the firewall will give the session a different UDP port number. The SIP proxy server will only learn this port number when the user phones out, so cannot direct incoming phone calls to a user before the user has called out.

If you use NAPT, the firewall will always give the same UDP port number to each user. This unchanging port number ensures that the SIP proxy server can always connect to the user.

Like enhanced NAT, NAPT also lets users on your LAN access the Internet when you have many private IP addresses on your LAN and one public IP address on the firewall.

Configuration

To use NAPT on an interface, apply a firewall policy to that interface and create rules on the policy. Use the command:

```
add firewall policy=name rule=id interface=interface
    action=nat nattype=napt protocol=udp
    ip=private-ip-address gblip=public-ip-address
    port=private-port gblport=public-port [other-options...]
```

NAPT translates between the addresses specified in the **ip** and **glbip** parameters, and the ports specified in the **port** and **gblport** parameters (Table 4). You need to create rules on both the private and public interfaces.

Table 4: The translation performed by NAPT

Interface	Traffic direction	Translation direction	IP parameters	Port parameters
Private	Outgoing traffic	Private to public settings	**ip** to **glbip**	**port** to **glbport**
	Incoming return traffic for sessions initiated on private side	Public to private settings	**gblip** to **ip**	**gblport** to **port**
Public	Incoming traffic	Public to private settings	**gblip** to **ip**	**gblport** to **port**
	Outgoing return traffic for sessions initiated on public side	Private to public settings	**ip** to **glbip**	**port** to **glbport**

Configuring the Firewall to Allow VoIP Phone Calls

This section describes how to configure the SIP ALG and NAPT on the firewall.

Before you start

This section describes the IP and firewall configuration. You also need to:

- configure the underlying connection to the Internet, such as PPP or ADSL.
- create a security officer and enable system security, if required.

Procedure

Step	Commands	Action
1	add ip interface=*interface* ipaddress=*ipadd* [*other-ip-parameters*] add ip route=0.0.0.0 mask=0.0.0.0 interface=*public-interface* nexthop=*ipadd* enable ip	Configure IP on the public and private interfaces: • assign IP addresses • create a default route on the public interface, if required • enable IP.
2	enable firewall	Enable the firewall.
3	enable firewall sipalg	Enable the SIP ALG.
4	create firewall policy=*name* [*other-policy-parameters*]	Create a firewall policy.
5	add firewall policy=*name* interface=*public-interface* type=public add firewall policy=*name* interface=*private-interface* type=private	Use the policy on the router's public and private interfaces.
6	add firewall policy=*name* rule=*id* interface=*interface* protocol=udp action=nat nattype=napt ip=*user-private-ip* gblip=*public-ip* port=*private-sip-port* gblport=*user-global-sip-port*	Create policy rules to use NAPT for: • each user in the LAN, on • both the public and the private interfaces NAPT translates between public and private IP address and UDP port.

Example

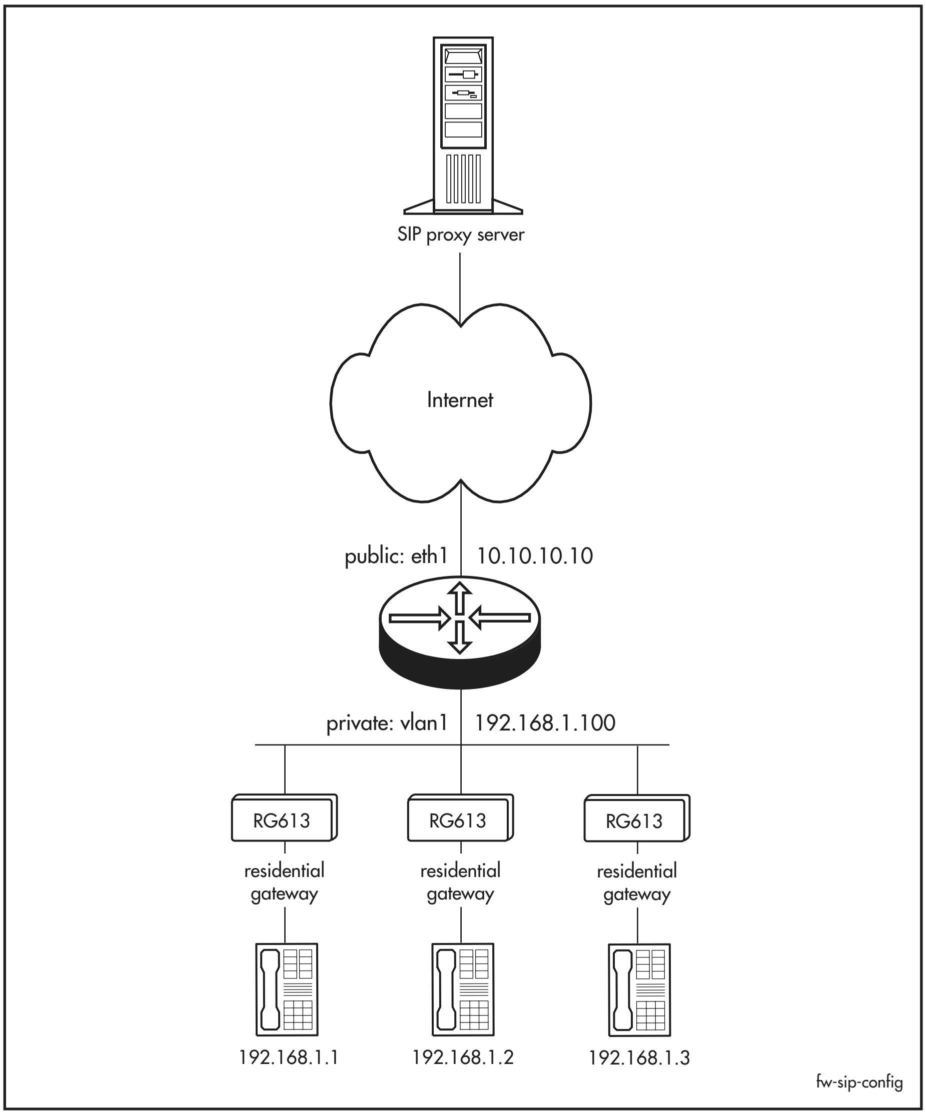
In this scenario (Figure 1):

- Three users need to receive and make phone calls through a firewall. An AR750S router is the firewall.
- The router's interface to the public Internet is eth1.
- The router's interface to the private LAN is vlan1. Each user is directly plugged into one of the router's LAN switch ports.

Important: This example uses 10.10.10.10 instead of a globally-unique IP address on the firewall's public interface. Replace this address with a suitable global address for your network.

This example only describes the configuration of the firewall to allow traffic to and from residential gateways and phones. You may also need to configure firewall rules for other devices in the LAN, such as servers and PCs.

Figure 1: Configuration for allowing VoIP traffic through the firewall



```
# Allowing VoIP phone calls through the firewall
# IP and firewall configuration

# Configure IP on eth1 public interface
# Note: Replace 10.10.10.10 in this example with your globally-unique IP address
enable ip
add ip interface=eth1 ip=10.10.10.10
add ip route=0.0.0.0 mask=0.0.0.0 interface=eth1 next=ip-address-of-your-isp

# Configure IP on vlan1 private interface
add ip interface=vlan1 ip=192.168.1.100 mask=255.255.255.0

# Enable the firewall and the SIP ALG
enable firewall
enable firewall sipalg

# Create a firewall policy and add the interfaces to it
create firewall policy=voip
add firewall policy=voip interface=eth1 type=public
add firewall policy=voip interface=vlan1 type=private

# Configure NAPT by using firewall rules on public interface
# Note: Enter each command into the router on a single line
add firewall policy=voip rule=11 interface=eth1 protocol=udp action=nat nattype=napt
    ip=192.168.1.1 gblip=10.10.10.10 port=5060 gblport=61001
add firewall policy=voip rule=12 interface=eth1 protocol=udp action=nat nattype=napt
    ip=192.168.1.2 gblip=10.10.10.10 port=5060 gblport=61002
add firewall policy=voip rule=13 interface=eth1 protocol=udp action=nat nattype=napt
    ip=192.168.1.3 gblip=10.10.10.10 port=5060 gblport=61003

# Configure NAPT by using firewall rules on private interface
# Note: Enter each command into the router on a single line
add firewall policy=voip rule=1 interface=vlan1 protocol=udp action=nat nattype=napt
    ip=192.168.1.1 gblip=10.10.10.10 port=5060 gblport=61001
add firewall policy=voip rule=2 interface=vlan1 protocol=udp action=nat nattype=napt
    ip=192.168.1.2 gblip=10.10.10.10 port=5060 gblport=61002
add firewall policy=voip rule=3 interface=vlan1 protocol=udp action=nat nattype=napt
    ip=192.168.1.3 gblip=10.10.10.10 port=5060 gblport=61003
```

New and Modified Commands

The following commands are new in Software Version 2.7.4:

- enable firewall sipalg
- disable firewall sipalg

The following commands include new features in Software Version 2.7.4:

- add firewall policy rule
- enable firewall policy debug
- disable firewall policy debug

New parameter options are shown in **bold** in the command syntax.

The following **show** commands include new information in Software Version 2.7.4:

- show firewall
- show firewall policy

New entries are shown in **bold** in the example output.

enable firewall sipalg

Syntax

```
ENAble FIREwall SIPAlg
```

Description This command enables the Session Initiation Protocol (SIP) Application Layer Gateway (ALG). The SIP ALG allows SIP to set up sessions through the firewall, when used in combination with NAPT firewall policy rules to modify SIP packets. The SIP ALG is disabled by default.

disable firewall sipalg

Syntax

```
DISable FIREwall SIPAlg
```

Description This command disables the Session Initiation Protocol (SIP) Application Layer Gateway (ALG). The SIP ALG is disabled by default.

add firewall policy rule

Syntax

```
ADD FIREwall POLIcy=policy-name RUle=rule-id
    ACtion={ALLOw|DENY|NAT|NONat} INTerface=interface
    PROTocol={protocol|ALL|EGP|GRE|ICmp|OSPF|SA|TCP|UDP}
    [AFTer=hh:mm] [BEFore=hh:mm]
    [DAYs={MON|TUE|WED|THU|FRI|SAT|SUN|WEEKDAY|
    WEEKEND}[,...]] [ENCapsulation={NONE|IPSec}]
    [GBLIP=ipadd] [GBLPort={ALL|port[-port]|service-name}]
    [GBLRemoteip=ipadd[-ipadd]] [IP=ipadd[-ipadd]]
    [LISt={list-name|RADius}]
    [NATType={DOuble|ENHanced|NApt|REVerse|STAndard}]
    [NATMask=ipadd] [POrt={ALL|port[-port]|service-name}]
    [REMoteip=ipadd[-ipadd]] [SOurceport={ALL|port[-port]}]
    [TTL=hh:mm]
```

Description of changes

With Software Version 2.7.4 you can add up to 1200 rules to each firewall policy.

A new option, **napt**, has been added to the **nattype** parameter. The **nattype** parameter may only be used when **action=nat**. NAPT translates the address and port of packets sent to and from private side devices. Therefore it translates source address and port for outbound traffic and destination address and port for inbound traffic (see Table 4 on page 6). The private side address and port are specified with the **ip** and **port** parameters. The public side address and port are specified with the **gblip** and **gblport** parameters.

enable firewall policy debug

Syntax

```
ENAble FIREwall POLIcy[=policy-name]
    DEBug={ALL|ARP|HTTP|PACKET|PKT|PROCESS|PROXY|SMTP|
    RADius|TCP|UPNP|ERRORcode|MESSage|PARSing|SIPAlg|TRAce}
```

Description of changes

This command enables the display of information that may help with diagnosing and fixing firewall behaviour. New debugging modes have been added for the SIP ALG. Debugging is disabled by default.

Table 5: New debugging options for SIP ALG

Option	Result
ERRORcode	Translates internal SIP ALG error codes into meaningful messages, displaying any errors encountered during processing.
MESSage	Translates each SIP message that is passed to the SIP ALG and displays its contents line by line. The contents of a SIP message include a SIP header and may include a Session Description Protocol (SDP) message body. Each message is displayed first in its unmodified state as it arrives for processing by the SIP ALG, then in its modified state after processing.
PARSing	Displays the steps the firewall takes during the parsing of a SIP message (header and body) while they are occurring. This includes showing how the message is modified to facilitate communication across the firewall.
SIPalg	Enables **errorcode**, **message**, and **parsing** debugging.
TRAce	Displays the names of all the functions that the SIP ALG calls when it processes a SIP message

disable firewall policy debug

Syntax

```
DISable FIREwall POLIcy[=policy-name]
    DEBug={ALL|ARP|HTTP|PACKET|PKT|PROCESS|PROXY|SMTP|
    RADius|TCP|UPNP|ERRORcode|MESSage|PARSing|SIPAlg|TRAce}
```

Description of changes

This command disables firewall debugging, including the new debugging options for SIP ALG. Debugging is disabled by default.

show firewall

Syntax

```
SHow FIREwall
```

Description of changes

Output from this command now indicates whether the SIP ALG is enabled or disabled.

Figure 2: Example output from the **show firewall** command

```
Firewall Configuration

Status .................... enabled
Enabled Notify Options .... manager
SIP ALG enabled ........... TRUE
Maximum Packet Fragments .. 20
Policy : voip
  TCP Timeout (s) .................. 3600
  UDP Timeout (s) .................. 1200
  Other Timeout (s) ................ 1200
  TCP Handshake Timeout Mode ........ Normal
  SMTP Domain ...................... not set
  TCP Setup Proxy .................. enabled
  UPNP ............................. disabled
    WAN interfaces ................. none
    LAN interfaces ................. none
    Maximum port maps .............. 250
  SIP ALG .......................... enabled
  Private Interface : eth1-1
  Private Interface : eth1-2
Public Interface  : eth0-0
    Method ......................... dynamic
```

show firewall policy

Syntax

```
SHow FIREwall POLIcy[=policy-name] [COUnter] [DYnamic]
    [LISt] [SUMmary] [USer]
```

Description of changes

When you specify a policy using the **policy** parameter, output from this command now indicates:

- whether the SIP ALG is enabled or disabled
- if one of the new debugging options is enabled on the policy
- if any rules on the policy use NAPT

If you specify the **counter** parameter, the output also includes the following entries:

- Total number of SIP messages

  The number of SIP messages this policy has processed since the router last started up.

- Number of SIP messages ignored

  The number of SIP messages that were passed to the SIP ALG but ignored because the SIP message type defined in the SIP message header was unknown (not supported).

- Number of audio sessions created

  The number of VoIP sessions that were created as a result of a successful SIP peer-to-peer negotiation, since the router last started up.

Figure 3: Example output from the **show firewall policy=voip** command

```
Policy : voip
  TCP Timeout (s) .................. 3600
  UDP Timeout (s) .................. 1200
  Other Timeout (s) ................ 1200
  TCP Handshake Timeout Mode ........ Normal
  MAC Cache Timeout (m) ............ 1440
  RADIUS Limit ..................... 100
  Accounting ....................... disabled
  Enabled Logging Options .......... none
  Enabled Debug Options ............ errorcode,parsing
  Identification Protocol Proxy ..... enabled
  Enabled IP options ............... none
  Enhanced Fragment Handling ........ none
  Enabled ICMP forwarding .......... none
  Receive of ICMP PINGS ............ enabled
  Number of Notifications .......... 0
  Number of Deny Events ............ 1
  Number of Allow Events ........... 0
  Number of Active TCP Opens ........ 0
  Number of Active Sessions ......... 0
  Cache Hits ....................... 0
  Discarded ICMP Packets ........... 0
  SMTP Domain ...................... not set
  TCP Setup Proxy .................. enabled
  UPNP ............................. disabled
    WAN interfaces ................. none
    LAN interfaces ................. none
    Maximum port maps .............. 250
  SIP ALG .......................... enabled
```

Figure 3: Example output from the **show firewall policy=voip** command (cont.)

```
Private Interface : eth0
  Trust Private ................... yes
  Rule ............................ 3
    Action ........................ nat
    NAT type ...................... napt
    IP ............................ 192.168.10.1
    Protocol ...................... UDP
    Port .......................... 5060
    Global IP ..................... 10.10.10.10
    Global Port ................... 61001
    Source Port ................... all
    Days .......................... all
  Rule ............................ 4
    Action ........................ nat
    NAT type ...................... napt
    IP ............................ 192.168.10.2
    Protocol ...................... UDP
    Port .......................... 5060
    Global IP ..................... 10.10.10.10
    Global Port ................... 61002
    Source Port ................... all
    Days .......................... all
Public Interface  : eth1
  Method .......................... dynamic
  Rule ............................ 1
    Action ........................ nat
    NAT type ...................... napt
    IP ............................ 192.168.10.1
    Protocol ...................... UDP
    Port .......................... 5060
    Global IP ..................... 10.10.10.10
    Global Port ................... 61001
    Source Port ................... all
    Days .......................... all
  Rule ............................ 2
    Action ........................ nat
    NAT type ...................... napt
    IP ............................ 192.168.10.2
    Protocol ...................... UDP
    Port .......................... 5060
    Global IP ..................... 10.10.10.10
    Global Port ................... 61002
    Source Port ................... all
    Days .......................... all
```

VLAN Tagging on Multiple Logical Ethernet Interfaces

Software Version 2.7.4 enables you to create up to 600 VLAN tagged logical interfaces on each Eth interface, and give them a VLAN priority.

Configuration

To create a VLAN tagged eth interface and give it a VLAN priority, use the command:

```
add ip interface=eth-interface ipaddress={ipadd|dhcp}
   [vlantag={1..4094|none}] [vlanpriority=0..7]
   [other-options...]
```

Example

To create two logical interfaces on the eth0 interface, tag them with different VLAN tags, and give traffic on one a higher priority, use the commands:

```
add ip interface=eth0-0 ipaddress=192.168.1.1 vlantag=2
   vlanpriority=2

add ip interface=eth0-1 ipaddress=192.168.2.1 vlantag=3
   vlanpriority=3
```

You could use these two interfaces to separate and prioritise traffic destined for two different users.

Modified Commands

add ip interface
set ip interface

Syntax

```
ADD IP INTerface=interface IPaddress={ipadd|DHCP}
   [ADVertise={YES|NO}] [BROadcast={0|1}]
   [DIRectedbroadcast={False|NO|OFF|ON|True|YES}]
   [FILter={0..99|NONE}] [FRAgment={NO|OFF|ON|YES}]
   [GRAtuitousarp={ON|OFF}] [GRE={0..100|NONE}]
   [IGMPProxy={OFF|UPstream|DOWNstream}]
   [INVersearp={ON|OFF}] [MASK=ipadd] [METric=1..16]
   [MULticast={BOTH|NO|OFF|ON|RECeive|SENd|YES}]
   [OSPFmetric=1..65534] [POLicyfilter={100..199|NONE}]
   [PREferencelevel={-2147483648..2147483647|NOTDEFAULT}]
   [PRIorityfilter={200..299|NONE}]
   [[PROxyarp={False|NO|OFF|ON|True|YES|STrict|DEFRoute}]
   [RIPMetric=1..16]
   [SAMode={Block|Passthrough}]
   [VJC={False|NO|OFF|ON|True|YES}]
   [VLANPRiority=0..7|None] [VLantag={1..4094|None}]
```

```
SET IP INTerface=interface [ADVertise={YES|NO}]
   [PREferencelevel={-2147483648..2147483647|NOTDEFAULT}]
   [BROadcast={0|1}]
   [DIRectedbroadcast={False|NO|OFF|ON|True|YES}]
   [FILter={0..99|NONE}] [FRAgment={NO|OFF|ON|YES}]
   [GRAtuitousarp={ON|OFF}] [GRE={0..100|NONE}]
   [IGMPProxy={OFF|UPstream|DOWNstream}]
   [INVersearp={ON|OFF}] [IPaddress=ipadd|DHCP]
   [MASK=ipadd] [METric=1..16]
   [MULticast={BOTH|OFF|ON|RECeive|SENd}]
   [OSPFmetric=1..65534|DEFAULT]
   [POLicyfilter={100..199|NONE}]
   [PRIorityfilter={200..299|NONE}]
   [PROxyarp={False|NO|OFF|ON|True|YES|STrict|DEFRoute}]
   [RIPMetric=1..16] [SAMode={Block|Passthrough}]
   [VJC={False|NO|OFF|ON|True|YES}]
   [VLANPRiority=0..7|None] [VLantag={1..4094|None}]
```

Description of changes

The new **vlanpriority** parameter specifies the value of the 802.1p User Priority field of the VLAN tag. This priority is written into all VLAN-tagged frames sent out the interface. Downstream routers may use this priority to determine the quality of service the frame receives. This parameter is only valid when **vlantag** is specified. The default is **none** when **vlantag**=**none**, and 0 when **vlantag** specifies a value.

The pre-existing **vlantag** parameter specifies the VID (VLAN Identifier) to be included in the header of each frame that is transmitted over the logical interface. This parameter is valid for Eth interfaces only. Multiple logical interfaces on the same physical interface can share the same VLAN tag. The default is **none**, which means no VID is included.

show ip interface

Syntax

```
SHow IP INTerface[=interface] [COUnter[=MULticast]]
```

Description of changes

Output of this command now includes the VLAN priority for Ethernet frames sent out over the interface.

Figure 4: Example output from the **show ip interface** command

```
Interface      Type      IP Address       Bc Fr PArp  Filt RIP Met.    SAMode  IPSc
Pri. Filt      Pol.Filt  Network Mask     MTU   VJC   GRE  OSPF Met.   DBcast  Mul.
VLAN Tag       VLAN Priority      InvArp
---------------------------------------------------------------------------------
LOCAL          ---       Not set          -  -  -     ---  --          Pass    --
---            ---       Not set          1500  -     ---  --          ---     ---
none           none               -
eth0-1         Static    192.168.2.1      1  n  On    ---  01          Pass    No
---            ---       255.255.255.0    1500  -     ---  0000000001  No      Rec
1              2                  -
eth0-2         Static    192.168.3.1      1  n  On    ---  01          Pass    No
---            ---       255.255.255.0    1500  -     ---  0000000001  No      Rec
2              0                  -
----------------------------------------------------------------------------------
```

Link Discovery Protocol

This enhancement enables the router or switch to receive and process Cisco® Discovery Protocol packets. This enables management of certain Cisco devices.

The Cisco Discovery Protocol is a link layer protocol used by Cisco devices to advertise their network layer addresses, device type and capabilities. Cisco devices regularly sent out advertisements. With this enhancement, the router or switch can read, check, and process these advertisements.

Parts of the Cisco CDP MIB (CISCO-CDP-MIB.mib) have also been implemented. The router or switch can:

- read all CDP MIB variables that relate to reception of CDP advertisements
- write the variables *cdpInterfaceEnable* and *cdpGlobalRun*.

You can create triggers to activate scripts when the CDP discovers a new device and when the CDP removes a device through the action of the holddown timer.

New Commands: CDP

disable lldp cdp

Syntax

```
DISable LLDP CDP
```

disable lldp cdp debug

Syntax

```
DISable LLDP CDP DEBug[={PACket|ADJacency|EVent}]
```

disable lldp cdp interface

Syntax

```
DISable LLDP CDP INTerface=interface
```

enable lldp cdp

Syntax

```
ENAble LLDP CDP
```

enable lldp cdp debug

Syntax

```
ENAble LLDP CDP DEBug[={PACket|ADJacency|EVent}]
```

enable lldp cdp interface

Syntax `ENAble LLDP CDP INTerface=`*`interface`*

where *interface* is one of:

- eth*n*

  An Eth port, where *n* is the Eth port instance (for example, eth0)

- port*m*

  A switch port, where *m* is the port number (for example, port2 for the switch port numbered 2).

reset lldp cdp counters

Syntax `RESET LLDP CDP COUnters`

reset lldp cdp table

Syntax `RESET LLDP CDP TAble`

show lldp cdp

Syntax `SHow LLDP CDP`

Figure 5: Example output from the **show lldp cdp** command

```
CDP general information
---------------------------------------------
Enabled ...................... Yes
Number of CDP neighbours ..... 14
SysUpTime .................... 12345.42s
CDP processing time .......... 3.385727s
Triggers:
  CDP neighbour add .......... -
  CDP neighbour remove ....... 5
---------------------------------------------
```

show lldp cdp entry

Syntax SHow LLDP CDP ENTry=*entryname* [PROTocol] [VERsion]

This command displays information about a neighbour or neighbours.

The **entry** parameter specifies the name of the neighbour you want information for. The string can be any format and can be terminated with a wild-card character (*) to match more than one device. The wild-card character can be entered on its own to match all neighbours.

Figure 6: Example output from the **show lldp cdp entry** command

```
CDP entry information
--------------------------------------------------------------------------------
Device ID ................ Switch
Protocol information:
  IP address ............... 192.168.1.202
Platform ................... cisco WS-C3750G-24TS
Capabilities ............... Router,Switch,IGMP device
Interface .................. port20
Port ID (outgoing port) ..... GigabitEthernet1/0/10
Holdtime ................... 155s
Version:
Cisco Internetwork Operating System Software
IOS (tm) C3750 Software (C3750-I5-M), Version 12.2(20)SE, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled Wed 19-May-04 11:52 by yenanh
--------------------------------------------------------------------------------
```

show lldp cdp interface

Syntax SHow LLDP CDP INTerface[=*interface*]

Figure 7: Example output from the **show lldp cdp interface** command

```
CDP interface information
-------------------------
Name              Status
-------------------------
port1             Down
port2             Up
port3             Down
port8             Up
port14            Down
port16            Up
-------------------------
```

show lldp cdp neighbour

Syntax SHow LLDP CDP NEIghbour [INTerface=*interface*] [DETail]

Figure 8: Example output from the **show lldp cdp neighbour** command

```
CDP neighbour information
-------------------------------------------------------------------------------
Device ID       Loc Int    Hold  Capability  Platform             Port ID
-------------------------------------------------------------------------------
Switch          port20     165s  RSI         WS-C3750G-24TS       Gig 1/0/10
-------------------------------------------------------------------------------
```

Figure 9: Example output from the **show lldp cdp neighbour detail** command

```
CDP neighbour information
-------------------------------------------------------------------------------
Device ID ................. Switch
Protocol information:
  IP address ................ 192.168.1.202
Platform .................... cisco WS-C3750G-24TS
Capabilities ................ Router,Switch,IGMP device
Interface ................... port20
Port ID (outgoing port) ..... GigabitEthernet1/0/10
Holdtime .................... 177s
Version:
Cisco Internetwork Operating System Software
IOS (tm) C3750 Software (C3750-I5-M), Version 12.2(20)SE, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled Wed 19-May-04 11:52 by yenanh
-------------------------------------------------------------------------------
```

show lldp cdp counters

Syntax SHow LLDP CDP COUnters

Figure 10: Example output from the **show lldp cdp counters** command

```
CDP traffic counters
-----------------------------------
Rx CDPv1 packets ....... 0
Rx CDPv2 packets ....... 1188
Rx total packets ....... 1188

Errors:
  Header syntax ........ 0
  Checksum error ....... 0
  No memory ............ 0
  Invalid .............. 0
  Fragments ............ 0
-----------------------------------
```

Modified Command: Triggers

create trigger

Syntax

```
CREATE TRIGger=trigger-id MODule=LLDP
    EVENT={CDPAdd|CDPRemove}
    [AFTer=hh:mm] [BEFore=hh:mm]
    [{DAte=date|DAYs=day-list}] [NAMe=name]
    [REPeat={Yes|No|ONCe|FORever|count}]
    [SCript=filename...] [STAte={ENAbled|DIsabled}]
    [TEST={YES|NO|ON|OFF|True|False}]
```

If you specify **event=cdpadd**, the trigger activates a script when the CDP discovers a new device.

If you specify **event=cdpremove**, the trigger activates a script when the CDP removes a device through the action of the holddown timer.

WAN Load Balancing

With the increasing use of the Internet to service core business functions comes the need for reliable WAN connectivity. A specific aspect of this requirement is for reliable connectivity to particular destinations. A simple and effective method of achieving this is to provide alternative network connections via different Internet Service Providers (ISPs).

WAN load balancing enables efficient use of multiple WAN connections. When a router simultaneously connects to multiple WAN networks, the WAN load balancer will try to distribute the router traffic equally across each network interface.

For detailed information and commands, see the WAN Load Balancing chapter of your router's Software Reference for Software Release 2.7.3.

Inactivity Timeout

This enhancement enables you to set inactivity timeout periods on:

- telnet and other TTY connections, by using the command **set tty**
- console connections over an ASYN port, by using the command **set asyn**.

When the idle timer expires for an ASYN connection, the user is logged out and the connection displays the login prompt. When the idle timer expires for a telnet connection, the user is logged out and the connection is terminated.

Modified Commands

set tty

Syntax `SET TTy` **`[IDLEtimeout={10..4294967294|OFF|0}]`**
`[`*`other-options`*`...]`

Timeout units are seconds. If the timeout value is **off** or **zero**, telnet sessions never time out. The default is **off**.

show tty

Syntax `SHow TTy[=`*`tty-number`*`|ALL]`

Figure 11: Example output from the **show tty** command

```
TTY information
Instance .................. 30
Login name ................ manager
Description ............... Telnet 1
Secure .................... yes
Connections to ............ 21
Current connection ........ 0
In flow state ............. on
Out flow state ............ on
Attached module ........... Telnet
Attached module instance .. 1
Type ...................... VT100
Prompt .................... default
Echo ...................... yes
Attention ................. char
Manager ................... yes
Edit mode ................. insert
History length ............ 30
Page mode/length .......... 22
Idle Timeout (seconds)..... 300
```

Figure 12: Example output from the **show tty=all summary** command

```
TTY Description User name Module Inst Mgr  Timeout
----------------------------------------------------------
016 Port 0      support   TSER   000  yes  off
018 Telnet 1    manager   TELN   001  yes  300
----------------------------------------------------------
```

set asyn

Syntax SET ASYn[=*asyn-number*]
[IDLEtimeout={10..4294967294|OFF|0}] [*other-options...*]

Timeout units are seconds. An asynchronous port with a value of **off** or **zero** never times out. The default is **off**.

show asyn

Syntax SHow ASYn[=*asyn-number*|ALL]

Figure 13: Example output from the **show asyn** command

```
ASYN 2:0000070953 seconds Last change at:0000009023 seconds

ASYN information
Name ..................... Asyn 0
Status ................... enabled
Mode ..................... PPP
PPP Index ................ 1
TX ACCM .................. 00000000
Data rate ................ 38400
Parity ................... none
Data bits ................ 8
Stop bits ................ 1
Test mode ................ no
In flow state (mode) ...... on (Hardware)
Out flow state (mode) ..... off (Hardware)
Autobaud mode ............ disabled
Max tx queue length ....... 100
TX queue length .......... 0
Transmit frame ........... none
RX queue length .......... 0
IP address ............... none
Max transmission unit ..... 1500
IPX Network .............. none
Control signals
DTR (out) .............. on on 1
RTS (out) .............. on - 1
CD (in) .............. off connect 0
CTS (in) .............. off - 0
RNG (in) .............. off - 0

TTY information
Instance ................. 18
Login Name ...............
Description .............. Asyn 2
Secure ................... yes
Connections to ...........
Current connection ........ none
In flow state ............ on
Out flow state ........... on
Type ..................... VT100
Prompt ................... login
Echo ..................... yes
Attention ................ break
Manager .................. no
Edit mode ................ insert
History length ........... 20
Page size ................ 22
Idle Timeout (seconds)..... 300
```

Summer Time

This enhancement enables you to:

- define a timezone
- enable summer time (daylight saving time) and specify when summer time starts and ends.

Once summer time is enabled, the local time automatically changes when summer time begins and ends.

You still need to set the local time by using the command:

```
set time
```

If you set the time before configuring summer time, set the time to standard time even if summer time currently applies. When you configure summer time the router or switch will automatically change the time to show summer time if necessary.

If you set the time after configuring summer time, set the time to the current local time: either summer time or standard time, whichever currently applies.

New Commands: Timezone

clear timezone

Syntax `CLear TIMEZone`

This command removes the timezone definition from the system, which is equivalent to setting a timezone of UTC±00:00.

set timezone

Syntax `SET TIMEZone[=`*`timezone-name`*`] [UTCoffset=`*`std-utc-offset`*`]`

where:

- *timezone-name* is a character string from 1 to 7 characters in length representing the timezone abbreviation for standard time for this timezone
- *std-utc-offset* is the amount of time by which this timezone is offset from UTC time during standard time (not summer time). Time is a positive or negative number in the format hh[:mm[:ss]], where hh=0-23, mm=0-59 and ss=0-59. If hours are specified then minutes and seconds are optional. If minutes are specified then seconds are optional.

This command supersedes the command **set utc offset**.

show timezone

Syntax `SHow TIMEZone`

Figure 14: Example output from the **show timezone** command

```
Timezone name is set to 'NZST', offset from UTC is +12:00
```

New Commands: Summertime

clear summertime

Syntax `CLear SUMMertime`

This command returns the summer time settings to default values (see **set summertime** below)

disable summertime

Syntax `DISable SUMMertime`

enable summertime

Syntax `ENAble SUMMertime`

set summertime

Syntax

```
SET SUMMertime[=summertime-zone-name]
    [STARTDAte=date]
    [STARTMonth=month STARTWeek=week STARTDay=day]
    [STARTTime=time]
    [ENDDAte=date]
    [ENDMonth=month ENDWeek=week ENDDay=day]
    [ENDTime=time]
    [Offset=offset]
```

`where:`

- *summertime-zone-name* is a character string from 1 to 7 characters in length.
- *date* is the date in d-mmm-yyyy, dd-mmm-yyyy, d-mmm-yy or dd-mm-yy format. The day is one or two digits, the month is the first three letters of the month (for example, apr), and the year is two or four digits.
- *month* is the name of the month. The name is the first three letters of the month (for example, apr).
- *week* is a number between 1 and 5. 1 represents the first week of the month and 5 represents the last week of month.
- *day* is the first three letters of the name of a day of the week (for example, mon, tue, wed).
- *time* is the time in hh[:mm[:ss]] format, where hh=0-23, mm=0-59 and ss=0-59. If hours are specified then minutes and seconds are optional. If minutes are specified then seconds are optional.
- *offset* is the number of minutes the time changes by, in the range 0 to 120.

Default values are:

```
summertime=dst

startmonth=apr startweek=1 startday=sun starttime=02:00

endmonth=oct endweek=5 endday=sun endtime=02:00

offset=60
```

show summertime

Syntax

```
SHow SUMMertime
```

Figure 15: Example output from the **show summertime** command

```
Summertime configuration
--------------------------------------------------------------------------------
  Enabled ........... No
  Summertime name ... DST
  Start ............. Sunday 02-Apr-2006 02:00am
  End ............... Sunday 30-Oct-2005 02:00am
  Offset ............ 60 minutes
  Start rule ........ Recurring,  First Sunday in April at 02:00am
  End rule .......... Recurring,  Last Sunday in October at 02:00am
--------------------------------------------------------------------------------
```

Displaying and Disabling All Active Debugging

This enhancement provides an easy way to:

- see which protocols currently have debugging enabled
- disable debugging for all these protocols at once.

New and Modified Commands

show debug active

Syntax SHow DEBug **[ACTive={ALL|*module*}]**

where *module* is the name of a switch or router module from the following list: BGP, INTERFACE, IP, LACP, MSTP, OSPF, PIM, RADIUS, STP, SWITCH, TACACS, TACPLUS or VRRP.

The output only shows the modules from this list that have debugging enabled. It does not list modules:

- for which debugging is disabled
- which are not in the list, even if debugging is enabled for them

Figure 16: Example output from the **show debug active** command

```
Active Debug


  BGP:

      Debug Types       Peer IP Address
      -------------------------------------
      msg               -
      state             192.168.1.20
      -------------------------------------


  DHCP: (no options available)


  IP IGMP:

      Destination IP Address    Source IP Address
      -------------------------------------------
      224.1.2.3                 -
      -                         10.10.10.1
      -                         192.168.1.20
      -                         192.168.2.20
      -------------------------------------------

  LOAD BALANCER:

      Debug Types Enabled:
        http
        firewall
        trace
```

disable debug active

Syntax

```
DISABLE DEBug ACTive={ALL|module}
```

where *module* is the name of a switch or router module from the following list: BGP, INTERFACE, IP, LACP, MSTP, OSPF, PIM, RADIUS, STP, SWITCH, TACACS, TACPLUS or VRRP.

Graphical User Interface (GUI) for AT-9900 Series Switches

The GUI (Graphical User Interface) is a web-based device management tool, designed to make it easier to configure and monitor the router or switch. The GUI provides an alternative to the CLI (Command Line Interface). Its purpose is to make complicated tasks simpler and regularly-performed tasks quicker.

See Using the Graphical User Interface (GUI) at the end of this Release Note for:

- browser settings
- details of how to access the switch via the GUI
- an overview of the GUI's features and navigation

The GUI is stored on the router or switch in the form of an embedded resource file, d9924e22.rsc. Resource files are model-specific, with the model and version encoded in the file name.

Using GUI Help

Help button

The GUI's context-sensitive help system is displayed in a pop-up window that covers the title of the GUI page. You can move the banner to any part of your screen and/or resize it. To display help, click the Help button above the sidebar menu or on the page for which you require assistance. The following types of help are available:

- Click **General Page Info** for brief information about background and process flow. This page is also displayed when you click the Help button.
- Click **Page Element Info** and roll your mouse over an element to view information about that element.

  To freeze the banner so that the help displayed does not change when you move the mouse, press the **Ctrl** key. To unfreeze, press the **Ctrl** key again. Note that element information is not available for most entries in tables. To see descriptions of table columns, click **Complete Help Page**.
- Click **Complete Help Page** to see all available information in a separate printable window, including information about elements.

Saving Configurations Entered with the GUI

Save button

Configuration changes applied using the GUI can be saved as a configuration file by clicking the Save button at the top of the sidebar menu. A pop-up Save window gives you the option of saving to the current configuration file, to another existing file, or to a new file. You can also choose to use this configuration when the router or switch restarts.

When the Save button is red, this indicates that changes have been made to the configuration and not yet saved. If you attempt to exit the GUI without saving the configuration, a pop-up window lets you choose whether or not to save it.

The configuration file you create with the GUI Save function records passwords in encrypted form, not plaintext.

Enhancements to Virtual Bridge (VLAN) MIB Support

RFC 2674, *Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering and Virtual LAN Extensions*, defines a portion of the Management Information Base (MIB) for managing IEEE Standard 802.1Q VLANs.

Objects defined in this MIB reside in the mib(1) sub-tree, under the *dot1dBridge* sub-tree defined in RFC 1493, and have the object identifier *qBridgeMIBObjects* ({ mib-2 dot1dBridge(17) qBridgeMIB(7) 1 }).

Previous software versions supported the following objects and groups in the MIB:

- All objects in the *dot1qBase* Group.
- The *dot1qVlanNumDeletes* object in the *dot1qVlan* Group.
- The *dot1qVlanCurrentTable* object in the *dot1qVlan* Group.
- The *dot1qVlanStaticTable* object in the *dot1qVlan* Group.
- The *dot1qNextFreeLocalVlanIndex* object in the *dot1qVlan* Group.
- The *dot1qPortVlanTable* object in the *dot1qVlan* Group.

Software Version 2.7.4 adds support for the *dot1qFdbTable* and *dot1qTpFdbTable* tables, and modifies the use of the *dot1qVlanFdbId* object in the *dot1qVlanCurrentEntry* table.

dot1qFdbTable contains configuration and control information for each Filtering Database currently operating on the device. *dot1qFdbTable* has an entry for each configured VLAN, containing the following objects:

- *dot1qFdbId*

  The identity of this Filtering Database. Returns the VLAN ID.

- *dot1qFdbDynamicCount*

  The current number of dynamic entries in this Filtering Database. Returns the number of MAC addresses used by the VLAN.

dot1qTpFdbTable contains information about unicast entries for which the device has forwarding and/or filtering information. *dot1qTpFdbTable* has an entry for each VLAN ID/MAC address pair, containing the following objects:

- *dot1qTpFdbAddress*

  A unicast MAC address for which the device has forwarding and/or filtering information.

- *dot1qTpFdbPort*

  Either the value ‘0’, or the port number of the port on which a frame having a source address equal to the value of the corresponding instance of *dot1qTpFdbAddress* has been seen. Returns the same value as the equivalent *dot1dTpFdbPort* object.

- *dot1qTpFdbStatus*

  The status of this entry; one of other(1), invalid(2), learned(3), self(4), or mgmt(5). Returns the same value as the equivalent *dot1dTpFdbStatus* object.

RADIUS Accounting and 802.1x Dynamic VLAN Assignment

The RADIUS server can now be configured to allow a user to be authenticated in only one place at a time. This is achieved by limiting the number of open RADIUS accounting sessions for a supplicant to one, and provides for greater security.

Radius accounting is included for:

- MAC based port authentication
- 802.1x port authentication in single-supplicant mode.

When a supplicant has been authenticated for a port, a START Accounting-Request message is sent to the RADIUS server.

When a supplicant becomes unauthenticated, a STOP Accounting-Request message is sent to the RADIUS server.

If no Accounting-Response is received from the RADIUS server after either a START or STOP Accounting message is sent, (and once the RADIUS module has reached its timeout and retry limit), the authorisation status of the supplicant remains unaffected, but an appropriate message is logged.

Enhancements to Login Authentication

This enhancement changes the approach that the router or switch uses for authenticating users from RADIUS and the User Authentication Database.

Before Software Version 2.7.4, the router or switch searched the local user database before attempting a RADIUS lookup. Software Version 2.7.4 enables you to configure the router or switch to interrogate the RADIUS server first.

To do this, create users in the User Authentication Database of the new type called "RADIUS unreachable" (RU) users, by using the command:

```
add user=login-name login={yes|no} password=password
    radiusbackup=yes [other-options...]
```

If RU users are defined in the user database, the router or switch performs the RADIUS lookup before checking the user database. If the lookup is successful, the user is logged into the router or switch.

If the RADIUS server is unreachable, then the router or switch performs a user database lookup for RU users only. Normal user database entries are not used in this case.

If the RADIUS authentication fails, then the router or switch performs a lookup in the user database, searching for normal (non-RU) users only.

Modified Commands

add user

Syntax

```
ADD USEr=login-name
LOgin={True|False|ON|OFf|Yes|No} PAssword=password
[RADiusbackup={ON|OFF|YES|NO|True|False}]
[other-options...]
```

set user

Syntax

```
SET USEr=login-name
[RADiusbackup={ON|OFF|YES|NO|True|False}]
[other-options...]
```

show user

Syntax `SHow USEr[=login-name]`

Figure 17: Example output from the **show user** command

```
Number of logged in Security Officers currently active ...1

Number of Radius-backup users..... 2

User Authentication Database
------------------------------------------------------------------------------
Username: dave ()
   Status: enabled    Privilege: Sec Off   Telnet: yes   Login: yes   RBU: yes
   Callback number: 0061393546786    Calling number: 5554491
   Logins: 2          Fails: 0        Sent: 0            Rcvd: 0
   Authentications: 0 Fails: 0
Username: manager (Manager Account)
   Status: enabled    Privilege: manager   Telnet: yes   Login: yes   RBU: no
   Logins: 4          Fails: 0        Sent: 0            Rcvd: 0
   Authentications: 0 Fails: 0
------------------------------------------------------------------------------

Active (logged in) Users
------------------------
User              Port/Device
    Login Time               Location
---------------------------------------------------------------------
manager           Asyn 0
    14:33:22 18-Apr-2002     local
manager           Telnet 1
    14:33:22 18-Apr-2002     10.1.1.1
---------------------------------------------------------------------
```

Firewall: Using RADIUS to Authenticate MAC Addresses

This enhancement extends the firewall's MAC address matching capabilities. It enables the firewall to send queries about MAC addresses to a RADIUS server. The response from the RADIUS server determines whether the packet is allowed or denied.

The firewall stores the MAC address and RADIUS result in its MAC address cache for a time length specified by using the command:

```
set firewall policy maccachetimeout=max-age
```

The default timeout is 1440 minutes (24 hours).

New and Modified Commands

add firewall policy rule

Syntax

```
ADD FIREwall POLIcy=policy-name RUle=rule-id
   ACtion={ALLOw|DENY|NAT|NONat} INTerface=interface
   PROTocol={protocol|ALL|EGP|GRE|ICmp|OSPF|SA|TCP|UDP}
   [LISt={list-name|RADius|MACRADIUS}] [other-options...]
```

reset firewall policy maccache

Syntax

```
RESET FIREwall POLIcy=policy-name MACCACHE
```

set firewall policy

Syntax

```
SET FIREwall POLIcy=policy-name [MACCACHETIMEOUT=max-age]
   [RADIUSLIMIT=number] [other-options...]
```

where

- *max-age* is a time period from 1 to 43200 minutes.
- *number* is a decimal value in the range 1 to 500.

show firewall policy

Syntax `SHow FIREwall POLIcy=`*`policy-name`*` [COUnter] [DYnamic] [LISt] [SUMmary] [USer]`

Figure 18: Example output from the **show firewall policy** command

```
Policy : admin
  TCP Timeout(s).................... 3600
  UDP Timeout(s).................... 1200
  Other Timeout(s).................. 1200
  MAC Cache Timeout (m) ............ 1440
  RADIUS Limit ..................... 100
  Accounting ....................... enabled
  Enabled Logging Options .......... allow denydump
  Enabled Debug Options ............ checksum
  Enhanced Fragment Handling ....... udp
  Enabled IP options ............... none
  Enabled ICMP forwarding .......... ping timeexceeded
  Receive of ICMP PINGS ............ enabled
  Number of Notifications .......... 0
  Number of Deny Events ............ 20
  Number of Allow Events ........... 8987
  Number of Active TCP Opens ....... 0
  Number of Active Sessions ........ 1
  Cache Hits ....................... 429073
  Discarded ICMP Packets ........... 74
  Spam Source Files ................ spam.spa
  SMTP Domain ...................... alliedtelesyn.co.nz
  HTTP Proxy Filter File ........... urlfilt.txt
  Cookies .......................... enabled
  TCP Setup Proxy .................. enabled
  UPNP ............................. enabled
    WAN interfaces ................. eth0
    LAN interfaces ................. vlan1
    Maximum port maps .............. 250
  Private Interface: eth0
    Trust Private .................. yes
  Public Interface: eth1
    Method ......................... dynamic
    Proxy .......................... http
      Private Interface ............ eth0
      IP ........................... 192.168.1.10
      Direction .................... both
      Days ......................... all
    NAT ............................ enhanced
      Method ....................... enhanced interface
      Private Interface ............ eth0
      Global IP .................... 172.20.8.2
    Rule ........................... 1
      Action ....................... allow
      RADIUS MAC Lookup ............ enabled
      IP ........................... 192.168.1.2
      Protocol ..................... TCP
      Port ......................... 23
      Global IP .................... 0.0.0.0
      Global Port .................. 23
      Source Port .................. all
      Days ......................... all
```

show firewall policy maccache

Syntax `SHow FIREwall POLIcy=`*`policy-name`*` MACCACHE`

Figure 19: Example output from the **show firewall policy maccache** command

```
Policy : test - Cached MAC Addresses
MAC Address        Rule Type  RADIUS Result  Expiry (min)  Cache Hits
-------------------------------------------------------------------------------
00-00-cd-0b-8c-84  Deny       Deny                    205          16
00-00-cd-00-ab-dc  Deny       Allow                   996         400
00-0a-17-29-11-91  Allow      Allow                   360          98
-------------------------------------------------------------------------------
```

Firewall: Automatic Teardown of Data Connections

With this enhancement, the firewall can close a WAN link as soon as all TCP connections are closed. This avoids the cost of unused dial-up links such as ISDN links.

The firewall detects when TCP sessions are opened and closed. You can configure triggers to activate when:

- the first session opens, by specifying **mode=start**
- the last TCP session closes, by specifying **mode=end**.

You can also see how many sessions are open.

Important This trigger only monitors TCP sessions, not UDP traffic or any other traffic. Remember that the firewall may still be passing non-TCP traffic.

Modified Commands

create trigger

Syntax

```
CREate TRIGger=trigger-id
   FIREwall={ALL|DOSattack|FRAgattack|HOStscan|PORtscan|
   SESSION|SMTPATTACK|SMUrfattack|SYNattack|TCPattack}
   [MODE={STArt|END|BOTH}] [AFTer=hh:mm] [BEFore=hh:mm]
   [{DAte=date|DAYs=day-list}] [NAMe=name]
   [REPeat={Yes|No|ONCe|FORever|count}]
   [SCript=filename...] [STAte={ENAbled|DIsabled}]
   [TEST={YES|NO|ON|OFF|True|False}]
```

set trigger

Syntax

```
SET TRIGger=trigger-id
   FIREwall={ALL|DOSattack|FRAgattack|HOStscan|PORtscan|
   SESSION|SMTPATTACK|SMUrfattack|SYNattack|TCPattack}
   [MODE={STArt|END|BOTH}] [AFTer=hh:mm] [BEFore=hh:mm]
   [{DAte=date|DAYs=day-list}] [NAMe=name]
   [REPeat={Yes|No|ONCe|FORever|count}]
   [TEST={YES|NO|ON|OFF|True|False}]
```

show trigger

Syntax SHow TRIGger=*trigger-id*

Figure 20: Example output from the **show trigger** command

```
Trigger .................... 1
Name ....................... Bring up Wellington link
Type and details ........... Time (13:45)
Days ....................... All
Active TCP sessions...........0
Enabled .................... Enabled
Test ....................... No
Repeat ..................... No
Created/Modified ........... 1-Jun-2005 12:04:33
Number of Activations ....... 1
Last Activation ............ 14-Jun-2005 13:45:07
Number of scripts .......... 2
callwgtn.scp
idlewgtn.scp
```

OSPF: Route Filtering with Route Maps

This enhancement enables you to configure route maps to filter OSPF routes. Route maps allow you to configure complex flexible filters. They achieve this by having several levels of structure:

- each route map consists of multiple entries
- each entry consists of an *action* (include or exclude) and at least one clause:
  - zero or one *match* clauses, which determine which OSPF route attributes match the entry. If you do not specify a match clause, every route matches.

    The match fields relevant for OSPF are interface, prefix list, next hop, route source, metric, route type and tag.
  - zero or more *set* clauses, which change the attributes of matching routes.

    The set clauses relevant for OSPF are metric, type and tag.

You can use the route map in OSPF:

- to filter OSPF routes before adding them to the IP route table for IP to use. To do this, create the route map and use it in the command:

  ```
  set ospf inroutemap=routemap-name
  ```
- when redistributing static routes as OSPF AS external LSAs. See “OSPF: Redistributing Static Routes” on page 46.

Modified Commands

For the **add ip routemap** and **set ip routemap** commands, this section only lists the command syntax that is relevant for OSPF. Further options for BGP are described in the Border Gateway Protocol version 4 (BGP-4) chapter of your router or switch’s Software Reference.

add ip routemap

Syntax for match clauses

```
ADD IP ROUTEMap=routemap ENTry=1..4294967295
    [ACtion={INCLude|EXCLude}] MAtch
    METRIC=0..4294967295[-0..4294967295]

ADD IP ROUTEMap=routemap ENTry=1..4294967295
    [ACtion={INCLude|EXCLude}] MAtch INTERFACE=interface

ADD IP ROUTEMap=routemap ENTry=1..4294967295
    [ACtion={INCLude|EXCLude}] MAtch
    ROUTETYPE={INTRA|INTER|TYPE1|TYPE2|OTHER}

ADD IP ROUTEMap=routemap ENTry=1..4294967295
    [ACtion={INCLude|EXCLude}] MAtch ROUTESOURCE=name

ADD IP ROUTEMap=routemap ENTry=1..4294967295
    [ACtion={INCLude|EXCLude}] MAtch NEXThop=ipadd
```

```
ADD IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] MAtch PREFIXList=name

ADD IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] MAtch TAG=1..65535
```

Syntax for set clauses

```
ADD IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] SET METRIC=0..4294967295

ADD IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] SET TYPE={1|2}

ADD IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] SET TAG=1..65535
```

The **routesource** and **prefixlist** parameters use a pre-configured prefix list. Prefix lists are already used by BGP and are described in the Border Gateway Protocol version 4 (BGP-4) chapter of your router or switch's Software Reference.

delete ip routemap

Syntax

```
DELete IP ROUTEMap=routemap ENTry=1..4294967295
   MAtch={ASPath|COMmunity|INTERFACE|MED|METRIC|NEXThop|
   ORIGin|PREFIXList|ROUTESOURCE|ROUTETYPE|TAG}

DELete IP ROUTEMap=routemap ENTry=1..4294967295
   SET={ASPath|BGPDampid|COMmunity|LOCalpref|MED|METric|
   ORIGin|TAG|TYPE}
```

set ip routemap

Syntax for match clauses

```
SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] MAtch
   METRIC=0..4294967295[-0..4294967295]

SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] MAtch INTERFACE=interface

SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] MAtch
   ROUTETYPE={INTRA|INTER|TYPE1|TYPE2|OTHER}

SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] MAtch ROUTESOURCE=name

SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] MAtch NEXThop=ipadd

SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] MAtch PREFIXList=name

SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] MAtch TAG=1..65535
```

Syntax for set clauses

```
SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] SET METRIC=0..4294967295

SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] SET TYPE={1|2}

SET IP ROUTEMap=routemap ENTry=1..4294967295
   [ACtion={INCLude|EXCLude}] SET TAG=1..65535
```

The **routesource** and **prefixlist** parameters use a pre-configured prefix list. Prefix lists are already used by BGP and are described in the Border Gateway Protocol version 4 (BGP-4) chapter of your router or switch's Software Reference.

set ospf

Syntax

```
SET OSPF [INROUTEMAP=[routemap-name]] [other-options...]
```

The **inroutemap** parameter specifies a route map to filter OSPF routes before adding them to the IP route table for IP to use. This route map can match on any of the route map options that are valid for OSPF: interface, prefix list, next hop, route source, metric, route type or tag.

show ip routemap

Syntax

```
SHow IP ROUTEMap=[routemap]
```

This command displays entries for the new route map **match** and **set** options.

Figure 21: Example output from the **show ip routemap** command

```
IP route Maps

Map Name
  Entry       Action
      Clauses
------------------------------------------------------------
1
  1           Include
       match   Interface vlan1
         set   Tag  1
------------------------------------------------------------
```

OSPF: Support for Passive Interfaces

OSPF passive interfaces are interfaces which do not operate as an OSPF interface, but their networks are added to the router LSA as a stub network. They do not exchange Hello packets or state transitions and have no OSPF neighbours.

You can specify whether or not all interfaces are treated as passive by default.

Ghost interfaces (those IP interface which are not added to the OSPF configuration) can be treated as passive interfaces if:

- OSPF is configured so that interfaces are passive by default, and
- there is a range defined on an area which includes the ghost interface's IP network.

Modified Commands

add ospf interface

Syntax

```
ADD OSPF INTerface=interface AREa={BAckbone|area-number}
[PASSive={ON|OFF|YES|NO|True|False}]
```

The default for **passive** is **off**.

set ospf

Syntax

```
SET OSPF
[PASSiveinterfacedefault={ON|OFF|YES|NO|True|False}]
```

The **passiveinterfacedefault** parameter specifies whether all OSPF interfaces other than those added by the **add ospf interface** command act as passive interfaces or not. If **on**, **yes** or **true** is specified, interfaces that are not added using the add ospf interface command will have a stub network link added to a router LSA, as long as the OSPF routing process can identify the area to which the interface belongs. This is done by finding an area's range that includes the address of the interface. If such a range is found, that range's area becomes the area for the passive interface. If **off**, **no** or **false** is specified, then non-OSPF interfaces will not act as passive interfaces. The default is **off**.

set ospf interface

Syntax

```
SET OSPF INTerface=interface AREa={BAckbone|area-number}
[PASSive={ON|OFF|YES|NO|True|False}]
```

show ospf interface

Syntax

```
SHow OSPF INTerface[=interface]
[AREa={BAckbone|area-number}] [IPaddress=ipadd]
[{FULl|SUMmary}]
```

Figure 22: Example output from the **show ospf interface** command for a specified interface

```
vlan1:
  Status ........................ Enabled
  Area .......................... Backbone
  IP address .................... 192.168.250.1
  IP net mask ................... 255.255.255.0
  IP network number ............. 192.168.250.0
  Type .......................... broadcast
  OSPF on demand ................ ON (OFF)
  Passive ....................... No
  State ......................... otherDR
  Router priority ............... 5
  Transit delay ................. 1 second
  Retransmit interval ........... 5 seconds
  Hello interval ................ 10 seconds
  Router dead interval .......... 40 seconds
  Poll interval ................. 120 seconds
  Interface events .............. 1
  Authentication ................ Password (area default)
  Password ...................... Charlie1
  Demand circuit ................ ON
  Designated router ............. 192.168.250.254
  Backup designated router ...... 192.168.250.253
  Metric boost 1 ................ 0
```

OSPF: Summary Routes for Routes Distributed in OSPF

This enhancement enables you to specify one or more summary address ranges. Each summary range specifies a network/mask pair. This becomes the network and mask for the external LSA that OSPF creates when any routes within the network range are distributed into OSPF. Therefore OSPF only advertises the network and mask of the summary, not the network and mask of the individual routes that initiate the advertisement.

Each summary range also optionally specifies whether matching routes are advertised or not, and what the route tag of the AS external LSA is.

New Commands

add ospf summaryaddress

Syntax

```
ADD OSPF SUMMaryaddress=ipadd MASK=ipadd
[ADVertise={ON|OFF|YES|NO|True|False}] [TAG=0..65535]
```

The **tag** parameter specifies the tag value that OSPF places in the OSPF AS external LSAs created as a result of redistributing routes. The default tag value is 0. This tag setting overrides tags set by the original route and by the route map used to select the sub-routes for redistribution, so by default the summary route has a tag of 0.

delete ospf summaryaddress

Syntax

```
DELete OSPF SUMMaryaddress=ipadd
```

The **summaryaddress** parameter specifies the IP prefix that defines a range of routes to no longer summarise.

set ospf summaryaddress

Syntax

```
SET OSPF SUMMaryaddress=ipadd MASK=ipadd
[ADVertise={ON|OFF|YES|NO|True|False}] [TAG=0..65535]
```

show ospf summaryaddress

Syntax

```
SHow OSPF SUMMaryaddress
```

Figure 23: Example output from the **show ospf summaryaddress** command

```
OSPF summary addresses
-----------------------------------------------------------
Base IP address       Mask             Advertise    Tag
-----------------------------------------------------------
192.168.1.0           255.255.255.0    Yes          13
10.3.0.0              255.255.0.0      No           0
-----------------------------------------------------------
```

OSPF: Enhancements to OSPF Ranges

This enhancement changes the way that OSPF summarises routes when you specify an OSPF range. Ranges are specified by using the command:

```
add ospf range=ipadd area={backbone|area-number} [mask=ipadd]
    [effect={advertise|donotadvertise}]
```

OSPF now:

- creates a summary route as soon as you enter the **add ospf range** command, rather than after an OSPF reset
- removes the individual routes that the new range summarises
- reinstates the individual routes when the range is deleted.

This enhancement did not require changes to the command syntax.

OSPF: Redistributing Static Routes

This enhancement enables OSPF to redistribute static routes. You can also optionally specify:

- a route map to select routes and set route parameters
- route metric
- metric type
- route tag
- whether subnets (classless network routes) can be redistributed, or only classfull network routes.

New Commands

add ospf redistribute

Syntax

```
ADD OSPF REDistribute PROTocol=STAtic [METric=metric]
    [ROUTEMap=routemap] [SUBNET={ON|OFF|YES|NO|True|False}]
    [TAG=0..65535] [TYpe={1|2}]
```

The **routemap** parameter specifies a route map to filter static routes before redistributing them through OSPF. This route map can match on interface, prefix list, next hop, metric, or tag.

delete ospf redistribute

Syntax

```
DELete OSPF REDistribute PROTocol=STAtic
```

set ospf redistribute

Syntax

```
SET OSPF REDistribute PROTocol=STAtic [METric=metric]
    [ROUTEMap=routemap] [SUBNET={ON|OFF|YES|NO|True|False}]
    [TAG=0..65535] [TYpe={1|2}]
```

show ospf redistribute

Syntax

```
SHow OSPF REDistribute
```

Figure 24: Example output from the **show ospf redistribute** command

```
OSPF Redistribute

Protocol     Metric       RouteMap           Subnet   Tag          Type
------------------------------------------------------------------------
Static               20   -                  YES               0   Ext2
```

BGP: Enhancements to Prefix Filtering

This enhancement changes the method of configuring prefix filters on BGP peers. BGP can now use prefix lists to define the filter.

Prefix filtering rejects some of the routes from an update message, without rejecting the whole update. This enables you to configure the router or switch to accept only routes for particular networks from a particular peer, and to send only routes for particular networks to a particular peer.

To create a prefix list, use the command

```
add ip prefixlist=name entry=1..65535
    [action={match|nomatch}] [masklength=range] [prefix=ipadd]
```

See the Border Gateway Protocol version 4 (BGP-4) chapter of your router or switch's Software Reference for more information about prefix lists.

Then apply the filter to a BGP peer or peer template definition, using one of the commands:

```
add bgp peer=ipadd remoteas=asn [infilter=prefixlist-name]
    [outfilter=prefixlist-name] [other-options]

set bgp peer=ipadd [infilter=prefixlist-name]
    [outfilter=prefixlist-name] [other-options]

add bgp peertemplate=1..30 [infilter=prefixlist-name]
    [outfilter=prefixlist-name] [other-options]

set bgp peeertemplate=1..30 [infilter=prefixlist-name]
    [outfilter=prefixlist-name] [other-options]
```

The **infilter** parameter uses the prefix list to filter update messages that the router or switch receives from the peer. If a prefix matches a prefix in the prefix list, BGP rejects that route. Otherwise, it accepts the route.

The **outfilter** parameter uses the prefix list to filter update messages that the router or switch sends to the peer. If a prefix matches a prefix in the prefix list, BGP removes that route from the update message. Otherwise, it leaves the route in the update message and therefore advertises it to the peer.

You can continue to use IP filters as prefix filters. However, if you give a prefix list a name that matches an existing IP filter, BGP uses the prefix list.

Example To create a peer relationship on the local router or switch, with a peer that has the IP address 192.168.1.1 and is part of AS 1, and prevent the local router or switch from advertising routes from the 10.0.0.0/8 network, use the commands:

```
add ip prefixlist=10_network entry=1 action=match
    prefix=10.0.0.0/8

add bgp peer=192.168.1.1 remotas=1 outfilter=10_network
```

Support for SwitchBlade V2

Allied Telesyn announces the release of SwitchBlade V2, with improved switching functionality.

The new SwitchBlade includes the following hardware options, which are supported by Software Version 2.7.4:

Switch controller	AT-SB4211A V2	
	AT-SB4211A/L3 V2	Switch controller with Full Layer 3 feature licence bundle loaded
	AT-SB4211C V2	Switch controller with CAM memory card fitted
	AT-SB4211C/L3 V2	Switch controller with CAM memory card fitted and Full Layer 3 feature licence bundle loaded
Line cards	AT-SB4311 V2	48-port (RJ-45) Fast Ethernet
	AT-SB4352 V2	32-port (MT-RJ) Fast Ethernet
	AT-SB4412 V2	24-port (RJ-45) Gigabit Ethernet
	AT-SB4442 V2	24-port SFP Gigabit Ethernet
	AT-SB4541A V2	1-port 10 Gigabit Ethernet
	AT-SB4541C V2	1-port 10 Gigabit Ethernet with CAM fitted

AT-SB4311 V2, AT-SB4541A V2 and AT-SB4541C V2 are supported by Software Version 2.7.1 or higher.

All legacy cards can be used with V2 cards, except that you cannot pair a V2 controller with a legacy controller.

To increase focus on the SwitchBlade’s core functionality, the following feature licence bundles are no longer supported by Software Version 2.7.4:

Advanced Layer 3:

- IPv6 and DHCPv6
- BGP
- IS-IS
- Load Balancing

Security Pack:

- Firewall
- SMTP Proxy
- HTTP Proxy

Chapter 1

Using the Graphical User Interface (GUI) on AT-9900 Switches

Introduction

You can set up, manage, monitor, and troubleshoot the switch using the command line interface (CLI) or the web-based GUI. The GUI includes the commonly-required functions for a number of protocols. You can access the GUI using HTTP, for local or remote access or HTTPS, for secure remote access

This section describes the basic functionality of the GUI, including:

- What is the GUI?
  - an introduction to the Graphical User Interface
- Accessing the switch via the GUI:
  - browser and PC setup, including interaction with HTTP proxy servers
  - establishing a connection to your switch, including information about configuring SSL for secure access
  - the System Status page, the first GUI page you see
  - diagnosing and solving connection problems
- Using the GUI: navigation and features:
  - an overview of the menus
  - using configuration pages, with a description of key elements of GUI pages
  - combining GUI and CLI configuration

What is the GUI?

The GUI (Graphical User Interface) is a web-based device management tool, designed to make it easier to configure and monitor the switch. The GUI provides an alternative to the CLI (Command Line Interface). Its purpose is to make complicated tasks simpler and regularly-performed tasks quicker.

The GUI relies on an HTTP server that runs on the switch, and a web browser on the host PC. When you use the GUI to configure the switch, the GUI sends commands to the switch and the switch sends the results back to your browser, all via HTTP.

The tasks you may perform using the GUI are not as comprehensive as the command set available on the CLI, but for some protocols, a few clicks of the mouse are adequate.

The GUI is stored on the switch in the form of an embedded resource file, with an .rsc file extension. Resource files are model-specific, with the model and version encoded in the file name.

Accessing the Switch via the GUI

To use the GUI to configure the switch, you use a web browser to open a connection to the switch's HTTP server. Therefore, you need a PC, a web browser and the switch. Supported browsers and operating systems, and the settings you need on your PC and browser, are detailed in the following section. Switch setup is detailed in "Establishing a Connection to the Switch" on page 1-5.

Browser and PC Setup

The GUI requires a web browser installed on a PC. Table 1-1 shows supported combinations of operating system and browser.

Table 1-1: Supported browsers and operating systems

	IE 5.0	IE 5.5	IE 6.0	NS 6.2.2	NS 6.2.3
Windows 95	✓				
Windows 98	✓	✓	✓		
Windows ME	✓	✓	✓	✓	✓
Windows 2000	✓	✓	✓	✓	✓
Windows XP	✓	✓	✓	✓	✓

JavaScript must be enabled. To enable JavaScript in Internet Explorer:

1. From the Tools menu, select Internet Options
2. Select the Security tab
3. Click on the Custom Level button
4. Under the Scripting section, ensure that "Active scripting" is enabled.

To enable JavaScript in Netscape 6.2.*x*:

1. From the Edit menu, select Preference
2. Select the Advanced menu option.
3. Ensure that the "Enable JavaScript for Navigator" checkbox is checked.

The minimum screen resolution on the PC is 800x600.

Pop-up Windows

Pop-up windows must be allowed. If you are using a toolbar or plug-in on your browser to block pop-ups, disable it while using the GUI. The GUI displays detailed configuration options and information in pop-up windows.

Either turn the toolbar off or specify that pop-ups are allowed for the IP address of the router. To turn off a toolbar on Internet Explorer 6, select Toolbars from the View menu and make sure the toolbar is not checked.

HTTP Proxy Servers

An HTTP proxy server provides a security barrier between a private network's PCs and the Internet. The PCs send HTTP requests (and other web traffic) to the server, which then forwards the requests appropriately. Similarly, the server receives incoming HTTP traffic addressed to a PC on the private network, and forwards it to the appropriate PC. Proxy servers can be used to block traffic from undesirable web sites, to log traffic flows, and to disallow cookies.

If your browser is configured to use a proxy server, and the switch is on your side of the proxy server, you will need to set the browser to bypass proxy entries for the IP address of the appropriate interface on the switch. (See "Establishing a Connection to the Switch" on page 1-5 for information about giving switch interfaces IP addresses.)

Warning To ensure that your network's security settings are not compromised, see your network administrator for information about bypassing the proxy server on your system.

To bypass the proxy server on Internet Explorer, if your browser administration does not use a script, and the PC and the switch are in the same subnet:

1. From the Tools menu, select Internet Options.
2. Select the Connections tab and click the LAN Settings button.
3. Check the "Bypass proxy server for local addresses" checkbox.
4. If necessary, click the Advanced button and enter a list of local addresses.

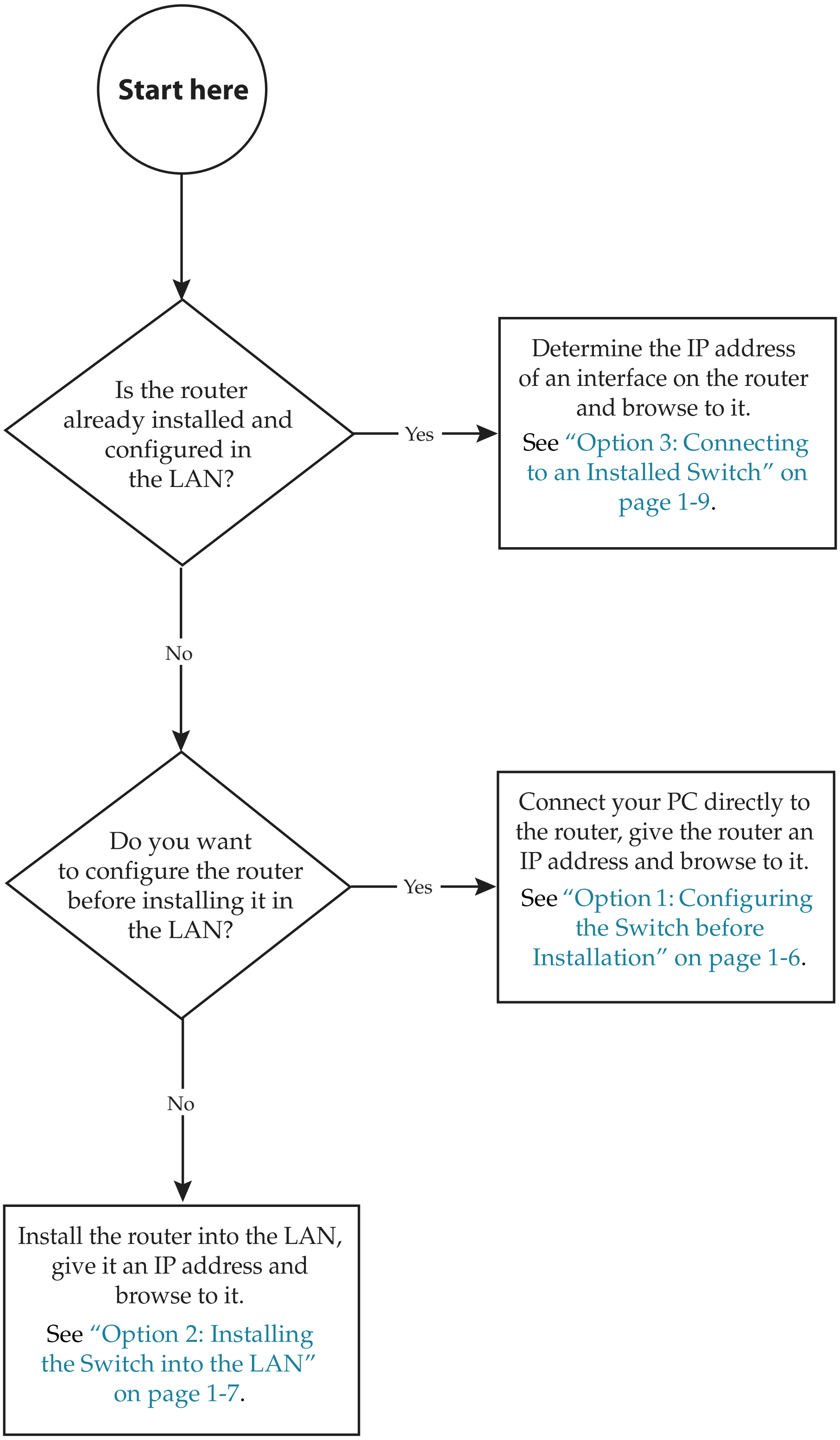
To bypass the proxy server on Netscape, if your browser does not use a script:

1. From the Edit menu, select Preferences
2. Click on the Advanced menu option to expand it.
3. Select the Proxies menu option
4. Enter the switch's IP address in the "No Proxy for" list.

Establishing a Connection to the Switch

Before you start, consider how the switch fits into your network. If you are installing a new switch, consider whether you want to configure it before deploying it into the LAN, or want to configure it *in situ*. If you want to access a switch that has already been configured, consider the relative positions of the PC and the switch. The flow chart below summarises this process, and the procedures that follow take you through each possibility in detail.

Figure 1-1: A summary of the process for establishing a connection via the GUI.


Start here
Is the router already installed and configured in the LAN?
Yes
Determine the IP address of an interface on the router and browse to it.
See "Option 3: Connecting to an Installed Switch" on page 1-9.
No
Do you want to configure the router before installing it in the LAN?
Yes
Connect your PC directly to the router, give the router an IP address and browse to it.
See "Option 1: Configuring the Switch before Installation" on page 1-6.
No
Install the router into the LAN, give it an IP address and browse to it.
See "Option 2: Installing the Switch into the LAN" on page 1-7.

Option 1: Configuring the Switch before Installation

Use this procedure if:

- You want to configure the switch before installing it in your LAN.
- You will be installing the switch at a remote office or a customer site and want to configure it first.
- You want a dedicated management PC permanently connected to the switch.

1. **Select a PC to browse to the switch from.**

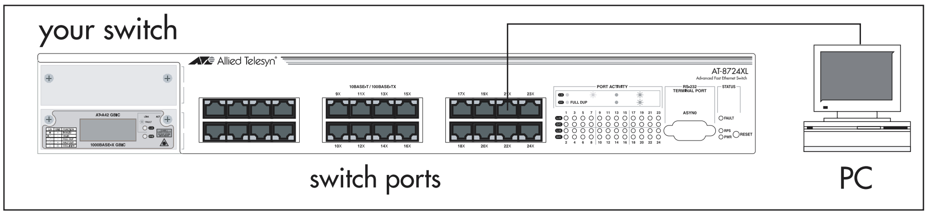
   You can browse to the switch from any PC that is running a supported operating system with a supported browser installed. See "Browser and PC Setup" on page 1-3 for more information.

   You need to know the subnet of the PC.

2. **Connect the PC to the switch.**

   Use a straight-through Ethernet cable to connect an Ethernet card on the PC to any one of the switch ports (see Figure 1-2).

Figure 1-2: Connecting a PC directly to the switch



Important You can browse to the switch through any VLAN, as long as you give that VLAN an IP address (below). These instructions assume you will use vlan1. The switch ports all belong to vlan1 by default.

3. **Access the switch's command line interface.**

   Access the CLI from the PC, as described in your Installation and Safety Guide or Quick Install Guide.

4. **Enable IP.**

   ```
   enable ip
   ```

5. **Assign the vlan1 interface an IP address in the same subnet as the PC.**

   ```
   add ip interface=vlan1 ip=ipaddress mask=mask
   ```

6. **Save the configuration and set the switch to use it on bootup.**

   ```
   create config=your-name.cfg
   set config=your-name.cfg
   ```

7. **On the PC, bypass the HTTP proxy server if necessary.**

   See "HTTP Proxy Servers" on page 1-4 for more information.

8. **Point your web browser at the LAN interface's IP address.**

9. At the login prompt, enter the user name and password.

The default username is manager:

```
User Name: manager
Password: friend
```

The System Status page is displayed (Figure 1-5 on page 1-11). Select options from the sidebar menu to configure and manage the switch.

Option 2: Installing the Switch into the LAN

Use this procedure if:

- You want to install the switch into the LAN before you configure it.

1. Select a PC to browse to the switch from.

You can browse to the switch from any PC that is running a supported operating system with a supported browser installed, with JavaScript enabled. See "Browser and PC Setup" on page 1-3 for more information.

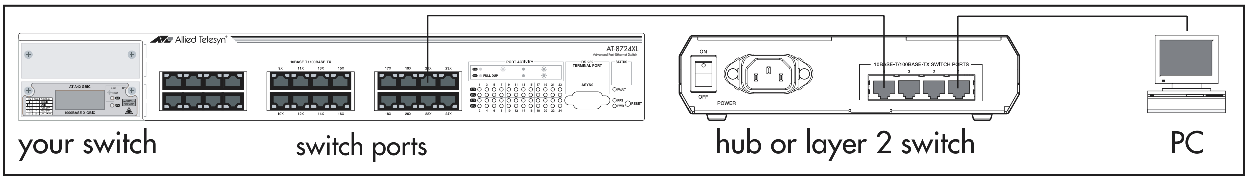
You need to know the PC's subnet.

2. Plug the switch into the LAN.

To install the switch into the same subnet as the PC:

Use an Ethernet cable to connect one of the switch ports to a device on the LAN segment, for example, a hub, router or switch (see Figure 1-3).

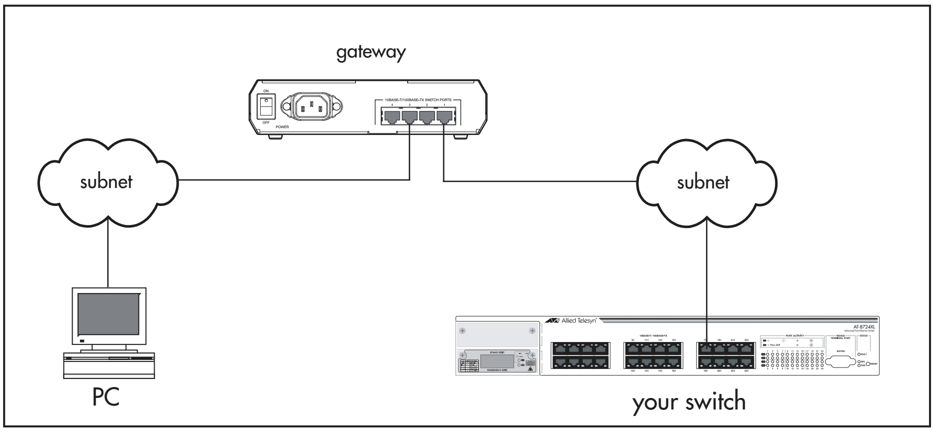
Figure 1-3: Connecting the switch into the same LAN segment as the PC.



To install the switch into a different subnet than the PC:

Use an Ethernet cable to connect any one of the switch ports to a device on the LAN segment in which you require the switch to work, for example, a hub, router, or switch (see Figure 1-4).

Figure 1-4: Configuring the switch from a PC in another subnet



Important You can browse to the switch through any VLAN, as long as you give that VLAN an IP address (below). These instructions assume you use vlan1. The switch ports all belong to vlan1 by default.

3. **Access the switch's command line interface.**

   Access the CLI from the PC, as described in your Installation and Safety Guide or Quick Install Guide.

4. **Enable IP.**

   ```
   enable ip
   ```

5. **Assign the vlan1 interface an IP address.**

   ```
   add ip interface=vlan1 ip=ipaddress mask=mask
   ```

   If you use DHCP to assign IP addresses to devices on your LAN, and you want to manage the switch within this DHCP regime, we recommend that you set your DHCP server to always assign the same IP address to the switch. This lets you access the GUI by browsing to that IP address, and also lets you use the switch as a gateway device for your LAN. If you need the switch's MAC address for this, you can display it with the command **show switch**. To set the interface to obtain its IP address by DHCP, use the commands:

   ```
   add ip interface=vlan1 ipaddress=dhcp
   
   enable ip remoteassign
   ```

6. **If the PC you want to browse from is in a different subnet from the switch, give the switch a route to the PC.**

   ```
   add ip route=pc-subnet interface=vlan1
      nexthop=gateway-ipaddress
   ```

   where:

   - *PC-subnet* is the IP subnet address of the PC. For example, if the PC has an IP address of 192.168.6.1 and a mask of 255.255.255.0, its subnet address is 192.168.6.0.
   - *gateway-ipaddress* is the IP address of the gateway device that connects the PC's subnet with the switch's subnet (Figure 1-4 on page 1-8).

7. **If you want to be able to browse to the GUI securely, configure SSL (Secure Sockets Layer).**

   For a step-by-step example, see "Configuration Example" in the Secure Sockets Layer (SSL) chapter of your Software Reference.

8. **Save the configuration and set the switch to use it on bootup.**

   ```
   create config=filename.cfg
   ```

   ```
   set config=filename.cfg
   ```

9. **On the PC, bypass the HTTP proxy server, if necessary.**

   See "HTTP Proxy Servers" on page 1-4 for more information.

10. **Point your web browser at the LAN interface's IP address.**

    For normal access, point your web browser to

    ```
    http://ip-address
    ```

    For secure access, point your web browser to

    ```
    https://ip-address
    ```

    where *ip-address* is the interface's IP address.

    For more information about secure access, see "Configuration Example" in the Secure Sockets Layer (SSL) chapter of your Software Reference.

11. **At the login prompt, enter the user name and password.**

    The default username is *manager*:

    ```
    User Name: manager
    ```

    ```
    Password: friend
    ```

    The System Status page is displayed (Figure 1-5 on page 1-11). Select options from the sidebar menu to configure and manage the switch.

Option 3: Connecting to an Installed Switch

Use this procedure if at least one interface on the switch already has an IP address, and the switch is already installed in a LAN.

1. **Find out the IP address of the switch's interface.**

   Ask your system administrator. Alternatively, access the CLI, as described in your Installation and Safety Guide or Quick Install Guide, and enter the command:

   ```
   show ip interface
   ```

Important You can browse to the switch through any VLAN, as long as you give that VLAN an IP address (below). These instructions assume you use vlan1. The switch ports all belong to vlan1 by default.

2. **Select a PC.**

   You can browse to the GUI from any PC that:

   - has an IP address in the same subnet as the switch, or that the switch has a route to
   - is running a supported operating system
   - has a supported browser installed, with JavaScript enabled

   See "Browser and PC Setup" on page 1-3 for more information.

3. **If necessary, bypass the HTTP proxy server.**

   See "HTTP Proxy Servers" on page 1-4 for more information.

4. **Browse to the switch**

   For normal access, point your web browser to

   ```
   http://ip-address
   ```

   where *ip-address* is the interface's IP address.

   To access the switch securely if SSL (Secure Sockets Layer) has been configured on the interface, point your web browser to

   ```
   https://ip-address
   ```

   For more information about secure access, see "Configuration Example" in the Secure Sockets Layer (SSL) chapter of your Software Reference.

5. **At the login prompt, enter the user name and password**

   The default username is manager:

   ```
   User Name: manager
   
   Password: friend
   ```

   The System Status page is displayed (Figure 1-5 on page 1-11). Select options from the sidebar menu to configure and manage the switch.

Secure Access

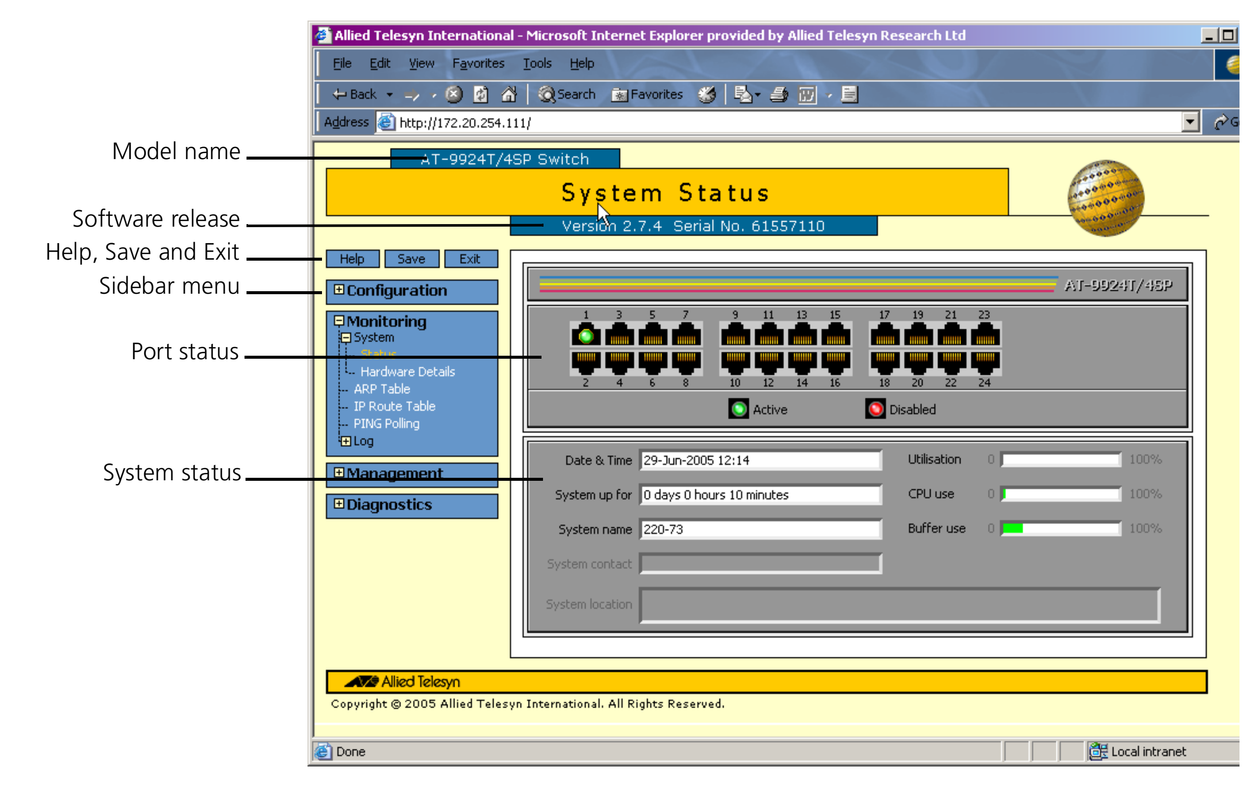
You can optionally browse to the switch using Secure Sockets Layer (SSL). This means that sensitive data including passwords and email addresses can not be accessed by malicious parties.

A detailed step-by-step example is in "Configuration Example" in the Secure Sockets Layer (SSL) chapter of your Software Reference.

System Status Details

The GUI opens to display the system status. Figure 1-5 points out key information contained on the page.

Figure 1-5: The System Status page



Date & Time 29-Jun-2005 12:14

System up for 0 days 0 hours 10 minutes

System name 220-73

System contact

System location

Utilisation 0 100%

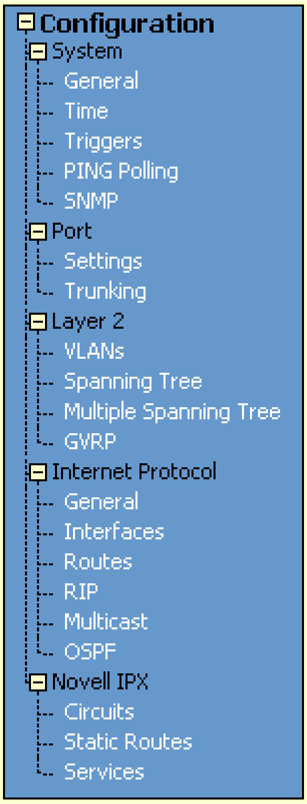
CPU use 0 100%

Buffer use 0 100%

Using the GUI: Navigation and Features

The GUI consists of a large number of *pages*, which you navigate between using the *menu* on the left of the browser window. This section describes how to use the GUI, and gives an overview of its functionality.

The Configuration Menu



Configuration available through the GUI includes:

- the system identity and mail server
- the system time, or NTP (Network Time Protocol)
- triggers, to automatically run scripts at a time you specify or in response to events you specify
- ping polling, to monitor device reachability and respond to changes in reachability
- SNMP (Simple Network Management Protocol)
- switch port settings, including mirroring, trunking and storm limits
- VLANs, STP, MSTP and GARP
- Internet Protocol: interfaces, static routes, the preferences of dynamic routes, RIP, multicasting, and OSPF
- IPX

Using Configuration Pages

Most protocols are configured by creating or adding an entry - an IP route, a PIM interface, and so on. For such protocols, configuration with the GUI is based on sets of three pages: first you see a “summary” page, and from that you access an “add” page and a “modify” page. Complex protocols are subdivided into different tabs, each with their own summary, add and modify pages.

Note Only one person can configure a particular switch with the GUI at a time, to avoid clashes between configurations. Monitoring and diagnostics pages can be viewed by more than one user at a time.

Note Use the menus and buttons on the GUI pages to navigate, not your browser’s buttons, to ensure that the configuration settings are saved correctly.

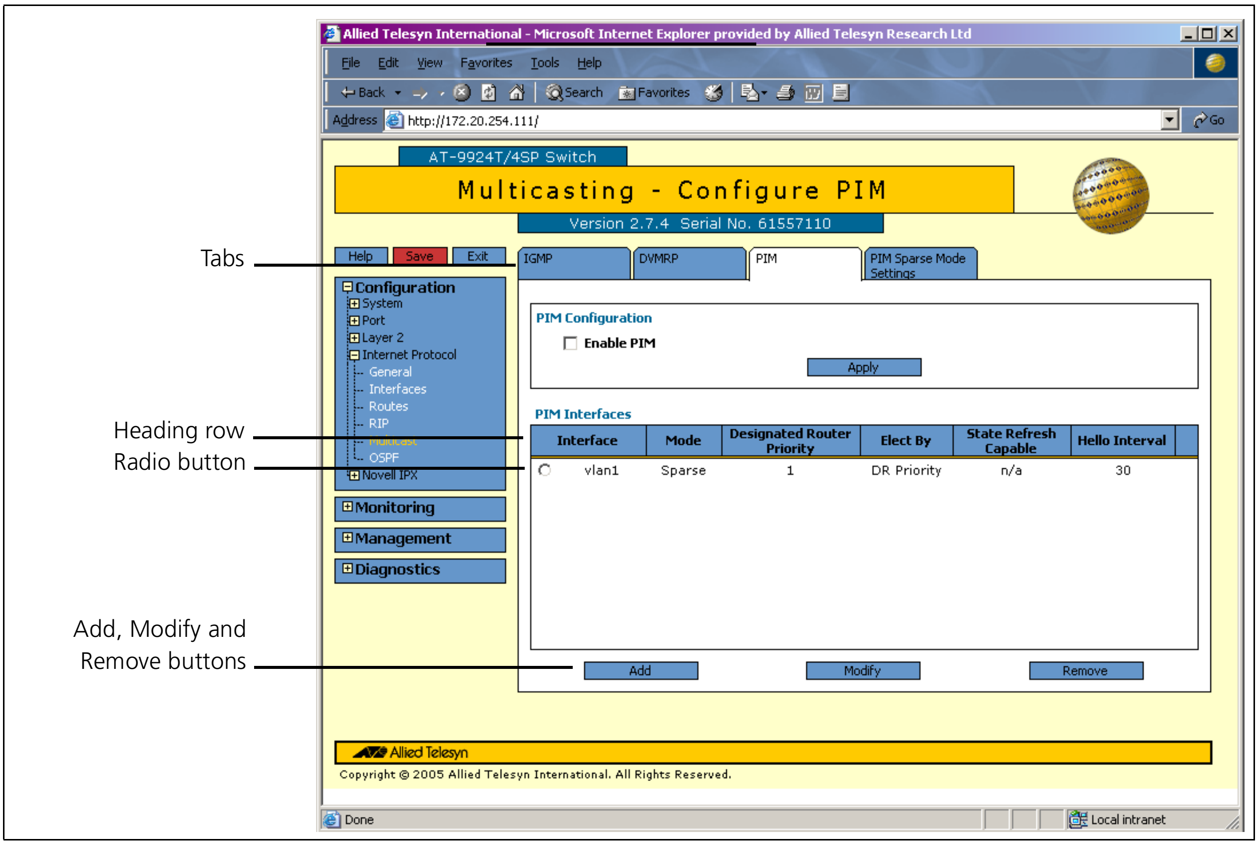
The summary page displays a *selection table* of existing items and information about them (for example, existing PIM interfaces; see Figure 1-6 on page 1-13). Below the selection table is a row of buttons, labelled Add, Modify and Remove.

To add a new item, click the Add button. This opens the popup “add” page, which lets you create a new item (for example, configure a new PIM interface; see Figure 1-7 on page 1-13).

To modify an existing item, select it by clicking on the option button at the beginning of its entry in the selection table. Then click the Modify button. This opens the popup “modify” page, which lets you expand or change the configuration (for example, change the Hello interval for a PIM interface; see Figure 1-8 on page 1-14).

To delete or destroy an item, select it by clicking on the option button at the beginning of its entry in the selection table. Then click the Remove button.

Figure 1-6: An example of a configuration page with a selection table



Address: http://172.20.254.111/

AT-9924T/4SP Switch

Multicasting - Configure PIM

Version 2.7.4 Serial No. 61557110

PIM Configuration

□ Enable PIM

PIM Interfaces

	Interface	Mode	Designated Router Priority	Elect By	State Refresh Capable	Hello Interval
○	vlan1	Sparse	1	DR Priority	n/a	30

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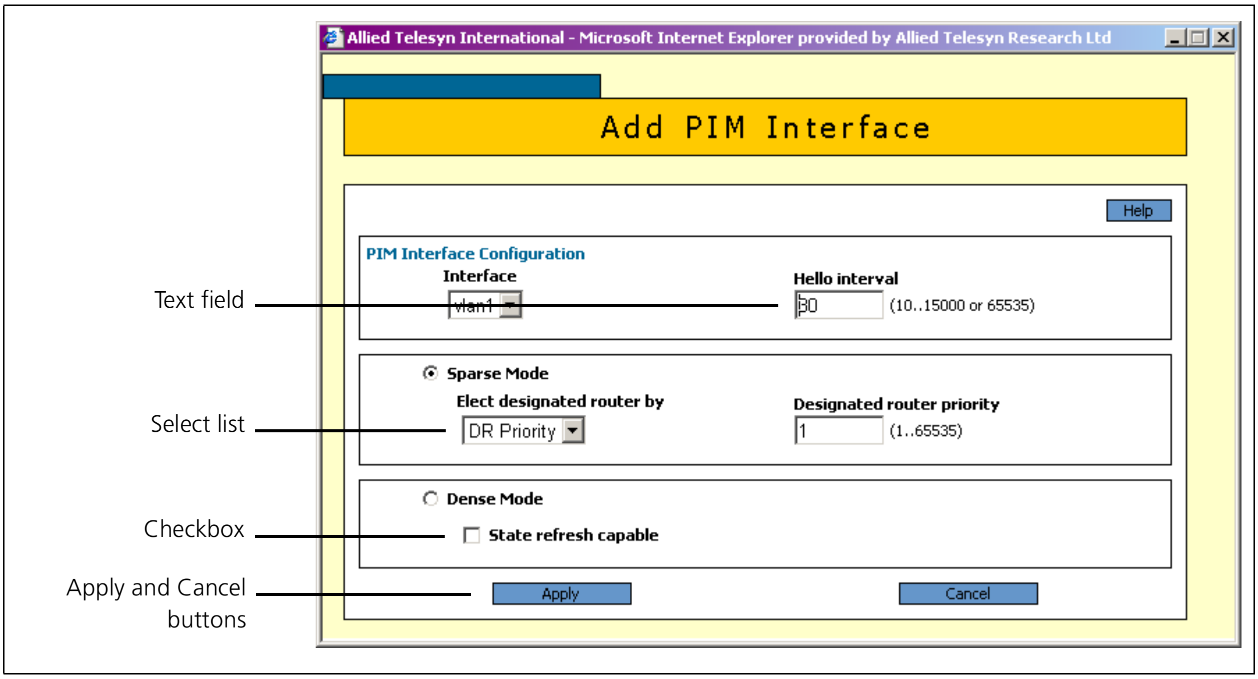
Figure 1-7: An example of a popup “add” page



Text field
Select list
Checkbox
Apply and Cancel buttons
Allied Telesyn International - Microsoft Internet Explorer provided by Allied Telesyn Research Ltd
Help
Apply
Cancel

Add PIM Interface

PIM Interface Configuration

Interface: vlan1

Hello interval: 30 (10..15000 or 65535)

● Sparse Mode

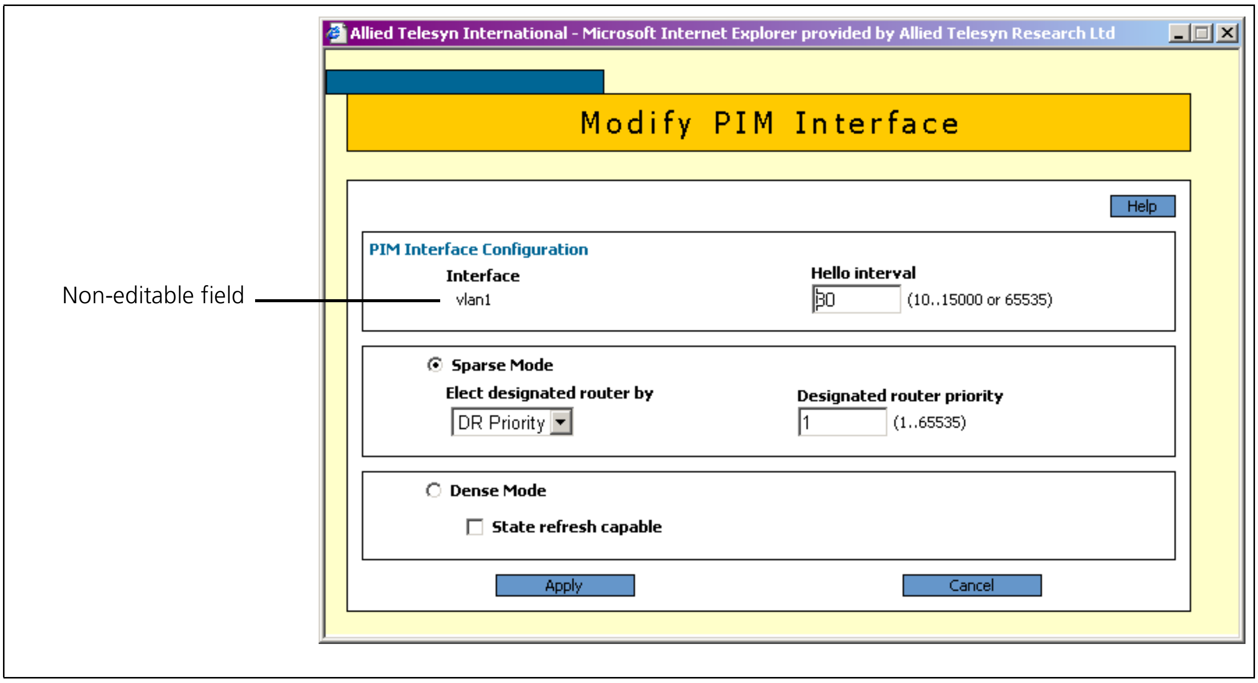
Elect designated router by: DR Priority

Designated router priority: 1 (1..65535)

○ Dense Mode

□ State refresh capable

Figure 1-8: An example of a popup “modify” page



Non-editable field

Allied Telesyn International - Microsoft Internet Explorer provided by Allied Telesyn Research Ltd

Modify PIM Interface

Help

PIM Interface Configuration

Interface
vlan1

Hello interval
30 (10..15000 or 65535)

● Sparse Mode

Elect designated router by
DR Priority

Designated router priority
1 (1..65535)

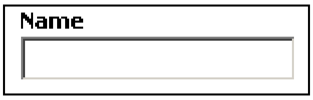
○ Dense Mode

□ State refresh capable

Apply Cancel

Editable Fields

GUI pages allow you to enter values or select options through a range of field types. These include:

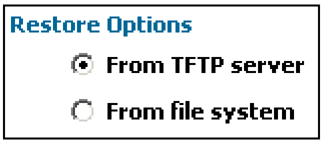


Name

- text fields, to enter character strings or numbers, especially for fields where there are few limits on the entries (such as names). See the online help for valid characters and field length

Link Quality Reporting
None
Link Quality Reporting
Echo

- select lists, to select one option from a small number of possibilities. Only valid options are listed. For example, if you are asked to select an IP interface from a drop-down list, the only interfaces displayed will be those you have assigned an IP address to



Restore Options
● From TFTP server
○ From file system

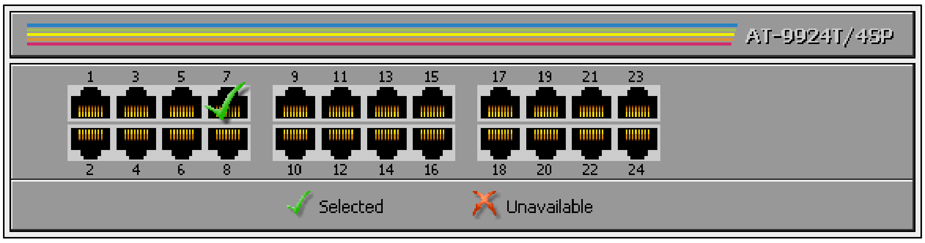
- radio button lists, to choose one of a set of mutually-exclusive options

☑ Enable port

- checkboxes, to enable or disable features.

Ports Graphic

Pages on which you can select switch ports use a Ports graphic - a visual representation of the switch ports.To toggle through the selection options, click on the icon representing the port you want to select or deselect.



Apply Button

An Apply button applies the configuration settings on the page or the section of the page. The new settings will take effect immediately, but are not automatically saved. To save the settings after clicking Apply, click the Save button above the menu.

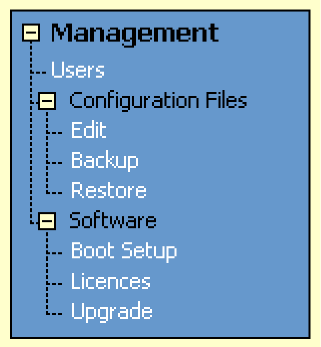
Cancel Button

A Cancel button closes a popup page without making any changes to the configuration.

Close Button

A Close button closes a popup page, and conserves any changes that you made to the settings on the page by clicking on buttons like Add, Modify, Remove or Apply. Changes you made to editable fields will not be conserved when you click Close (unless you first clicked Apply).

The Management Menu

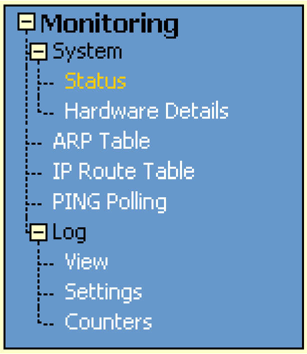


You can use the GUI to manage the switch itself, including:

- creating user accounts and enabling system security
- creating and editing files
- backing files up to the switch’s Flash memory or to a PC or TFTP server
- restoring the switch’s configuration from backup
- specifying which software and configuration files the switch uses on bootup, and displaying the currently-used files
- enabling software release and feature licences
- upgrading the switch’s software

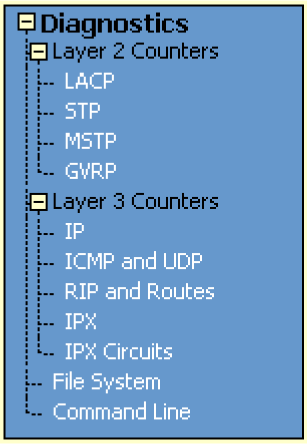
The Monitoring Menu

When you browse to the GUI, the sidebar menu opens to display the monitoring menu, opened at the System > Status. From this menu, other things you can check include:



- information about the switch’s hardware
- information about Address Resolution Protocol (ARP) entries
- the IP route table
- information about the state of ping polling, including counters
- the log messages that the switch automatically generates. You can also set up filters to determine where messages are saved to and which messages are saved.

The Diagnostics Menu



The GUI's diagnostics pages enable you to troubleshoot network problems and observe traffic flow, including:

- displaying LACP counters
- displaying STP, MSTP and GARP counters
- displaying the number and type of packets received and transmitted by IP, and discarded by the IP gateway
- displaying the number and type of ICMP and UDP packets received and transmitted
- displaying the number and type of RIP packets received and transmitted; and the octets received and transmitted over each IP route
- displaying the number and type of IPX packets received and transmitted; and the bytes received and transmitted over each IPX route
- displaying the contents of the switch's file system and how much memory is used and available. You can also delete files
- an interface to the switch's command line interface, allowing you to enter CLI commands.

Combining GUI and CLI Configuration

You can alternate between the GUI and the CLI without difficulty. Note that GUI pages will not automatically refresh to reflect changes in the CLI configuration; you must reload the relevant page (for example, by clicking the Refresh button on your browser).

Troubleshooting

The GUI resource file has an 8-digit name, with the .rsc file extension. To check which resource files are present on the switch, use the command:

```
show file
```

To see which GUI resource file the switch is currently using, and which it will use on bootup, use the command:

```
show install
```

To display information about the GUI resource file that is currently installed, use the command:

```
show gui
```

In particular, this command lets you check the file's validity. If the file is invalid or damaged, download a new file.

To display information about the switch's HTTP server, use the commands:

```
show http server

show http server session
```

Enabling and Disabling the GUI

The GUI is enabled by default. To enable or disable the GUI, use the following commands:

```
enable gui
disable gui
```

When enabled, the GUI works when a valid resource file for the hardware model is present in flash memory and when the HTTP server is enabled.

Deleting Temporary Files

Browsers store local copies of web pages as temporary files. If you upgrade to a new GUI resource file, or if you encounter problems in browsing to the GUI, you may need to delete these files (clear the cache). To clear the cache in Internet Explorer:

1. From the Tools menu, select Internet Options.
2. On the General tab, click the Delete Files button.
3. The Delete Files dialog box opens. Click the OK button.

To clear the cache in Netscape 6.2.*x*:

1. From the Edit menu, select Preferences
2. Click on the Advanced menu option to expand it.
3. Select the Cache menu option
4. Click the Clear Memory Cache and Clear Disk Cache buttons.

Accessing the Switch via the GUI

Problem **You cannot browse to the switch.**

Diagnosis Check if you can ping the switch's interface from your PC. If you get a response, this indicates that the interface's IP address is valid, and that your PC has a route to it.

Solution

- If you cannot ping the switch's interface:
  - Check that your PC's gateway is correct, so that your PC has a route to the switch.
  - The IP address of the switch's interface may be incorrect. To correct this, access the CLI and use the IPADDRESS parameter of command SET IP INTERFACE
  - The IP address of the switch's default gateway may be incorrect, so that the switch does not have a route back to your PC's gateway. To correct this, access the CLI and use the NEXTHOP parameter of the command ADD IP ROUTE or SET IP ROUTE.
- If the switch should be dynamically assigned an IP address, check that the DHCP server can reach the switch, by pinging the switch from the DHCP server.
- If your PC accesses the Internet through a proxy server, you may need to set your browser to bypass the proxy when browsing to the switch's IP

address range. See "HTTP Proxy Servers" on page 1-4 for more information.

- If you cannot access the GUI because your username or password fails, check that you are spelling them correctly. The username "manager" will always be valid. Its default password is "friend". Note that passwords are case sensitive.

Problem **The GUI is behaving inconsistently, or you cannot access some pages.**

Solution

- Delete your browser's temporary files (see "Deleting Temporary Files" on page 1-17) and try again.
- Check that JavaScript is enabled.
- If you are using a toolbar or plug-in on your browser to block pop-ups, disable it while using the GUI. The GUI displays detailed configuration options and information in pop-up windows.

  Either turn the toolbar off or specify that pop-ups are allowed for the IP address of the router. To turn off a toolbar on Internet Explorer 6, select Toolbars from the View menu and make sure the toolbar is not checked.
- Check that you are trying to access the GUI from a supported operating system and browser combination. See "Browser and PC Setup" on page 1-3 for more information.

Problem **The GUI does not seem to configure the switch correctly.**

Solution

- Use the buttons on the GUI pages to navigate, not your browser's Back, Forward or Refresh buttons. The GUI's navigation buttons perform aspects of the configuration.
- If you are using a toolbar or plug-in on your browser to block pop-ups, disable it while using the GUI. The GUI displays detailed configuration options and information in pop-up windows.

  Either turn the toolbar off or specify that pop-ups are allowed for the IP address of the router. To turn off a toolbar on Internet Explorer 6, select Toolbars from the View menu and make sure the toolbar is not checked.

Command Reference

This section describes the commands available on the switch to support day-to-day operational and management activities.

The shortest valid command is denoted by capital letters in the Syntax section. In your Software Reference, see

- "Conventions" in About this Software Reference for details of the conventions used to describe command syntax
- Appendix A, Messages for a complete list of messages and their meanings.

disable gui

Syntax

```
DISable GUI
```

Description

This command disables the web-based graphical user interface. If a GUI is installed, it is enabled by default.

The GUI resource file that the router is currently set to use can be deleted when the GUI is disabled. GUI resource files have an RSC extension. Use the **show install** command and check the "Current Install" section to see which resource file is currently set.

Related Commands

enable gui
reset gui
show gui

enable gui

Syntax

```
ENAble GUI
```

Description

This command enables the web-based graphical user interface. If a GUI is installed, it is enabled by default. Even when enabled, the GUI only works when:

- there is a valid resource file for the hardware model being used
- the HTTP server is enabled

The GUI resource file that the router is currently set to use can be deleted when the GUI is disabled. GUI resource files have an RSC extension. Use the **show install** command and check the "Current Install" section to see which resource file is currently set

Related Commands

disable gui
reset gui
show gui

reset gui

Syntax `RESET GUI`

Description This command is used after a new GUI resource file has been loaded so that the switch reads the updated file without the user rebooting the switch.

Example To use details from the GUI resource file that has just been loaded onto the switch, use the command:

```
reset gui
```

Related Commands disable gui
enable gui
load
set install
show gui

show gui

Syntax SHow GUI

Description This command displays information about the GUI status and the GUI resource file. The resource file contains the HTML pages that make up the GUI (Figure 1-9, Table 1-2 on page 1-21).

Figure 1-9: Example output from the **show gui** command

```
GUI Configuration
-------------------
Module Status          : Enabled

Resource File
-----------------------
Name                   : s_sb8e01.rsc
Status                 : Good

Header Info
-----------------------
Type                   : Switch
Model                  : Switchblade 4000
Gui Builder Version    : 2.1
Language               : English
Version                : 01
File Creation Date     : 5/4/2002
Build Type             : PRODUCTION
File Size              : 1260309
```

Table 1-2: Parameters in the output of the **show gui** command

Parameter	Meaning
Module Status	Whether the GUI is enabled or disabled.
Name	Filename of the GUI resource file.
Status	State of the resource file; either Good (no errors in the file) or Error. If the state is Error, a line is displayed below the status indicating the nature of the error.
Type	Type of GUI.
Model	The model the resource file has been produced to run on. Resource files are model-dependent, so this must be the same model as the switch.
GUI Builder Version	Version of the Allied Telesyn GUI creation program that this resource file was built with.
Language	Language in which the GUI is displayed.
Version	Version of the GUI.
File Creation Date	Date in day/month/year format when the resource file was created.
Build Type	The status of this build. "Production" indicates a build that has been released for use.
File size	Byte size of the resource file.

Example

To display information about the GUI, use the command:

```
    sh gui
```

Related Commands

disable gui
enable gui
reset gui